METAL INDUSTRY

WITH WHICH ARE INCORPORATED

ALUMINUM WORLD & COPPER AND BRASS

BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

VOL. 30 NEW YORK, JANUARY, 1932 No. 1

The Use of Non-Ferrous Metals in the Shipping Industry

By FRANCIS A. WESTBROOK

Mechanical Engineer

A Detailed Analysis of the Quantities and Proportions of Metals Used in the Construction of Merchant Ships

THE value of non-ferrous metals used in the shipping industry runs into surprisingly large figures. While it is not possible to give exact amounts for all of the non-ferrous metals used it is estimated by the National Council of American Shipbuilders that the value of copper, brass and bronze alloys used in the $75,000,000 building program for 1930 in the larger yards of the United States amounted to $3,611,000. The uses are also extremely varied and show to what a great extent the industry is dependent on copper and its alloys.

In addition to this lead, tin, zinc, aluminum, antimony and nickel play an important, if lesser, part.

The relative amounts of non-ferrous metals used is estimated by the American Bureau of Metal Statistics in the following manner: In pounds per gross ton, exclusive of electrical equipment:

Copper	20
Lead	3
Zinc	5
Tin	1

In 1930 the total for copper was about 5,000 tons and for lead approximately 500 tons. This includes naval vessels.

Copper. Copper, brass and bronze play much the most important part of all the non-ferrous metals in shipbuilding. They represent almost 5% of the $75,000,000 program of 1930. The American Council of Shipbuilders has analyzed the uses of copper with considerable completeness in Bulletin No. 159. It covers passenger ships, freighters, tankers, yachts and small vessels. The figures quoted do not include copper used in the shipyards to carry on operations. Now let us give our attention to a rather brief abstract of Bulletin No. 159.

The list of uses is divided into two groups, the first including items which consist practically entirely of copper, brass or bronze; and the second group covers parts which are only partially made of these materials. The first group comprises:

Sheet brass and copper and brass pipes and rods,
Brass and bronze castings,
Brass turbine blades,
Electrical conductors.

The second group consists of:

Brass and bronze hardware,
Brass bronze valves,
Copper, brass and bronze navigating equipment,
Interior communication equipment of copper, brass and bronze.
Copper, brass and bronze parts of motor and generating equipment,
Copper, brass and bronze electrical fixtures,
Interior decorative fixtures,
Brass and bronze used in the make up of gauges,
Copper and brass items pertaining to switchboards,
Copper, brass and bronze parts of fire extinguishers and other fire fighting apparatus,
Copper, brass and bronze parts of blowers, fans and ventilating machinery,
Brass and bronze items forming part of the airports and windows,
Copper parts of radio apparatus,
Copper items such as kettles, cooking utensils, heating units, dish washers, etc., found in the galley and pantry.

The following table taken from Bulletin No. 159 gives this list of applications together with the estimated value of each group and the percent represented by copper, brass and bronze.

SUMMARY AND ESTIMATE OF TOTAL VALUE OF COPPER, BRASS AND BRONZE MATERIALS USED IN A $75,000,000 SHIPBUILDING PROGRAM

Group	Approximate Total Value of Group	Per Cent Represented by Copper, Brass and Bronze Materials	Estimated Value of Copper, Brass and Bronze Materials
Sheet Brass, Brass and Copper Pipes and Rods	$484,000	100	$484,000
Cast Brass	793,000	100	793,000
Brass Blading	192,000	100	192,000
Electric Cable	340,000	90	306,000
Hardware	429,000	40	172,000
Valves	610,000	30	183,000
Navigating Outfit	443,000	50	221,000
Interior Communication	487,000	30	146,000
Motors and Generators	1,240,000	10	124,000
Electrical Fixtures	652,000	50	326,000
Interior Decoration	1,115,000	5	56,000
Gages	103,000	30	31,000
Switchboards and Instruments	169,000	60	101,000
Fire Prevention	293,000	10	29,000
Ventilation	400,000	10	40,000
Metal Airports and Windows	435,000	60	261,000
Radio Apparatus	136,000	50	68,000
Galley and Pantry Equipment	783,000	10	78,000
Total			$3,611,000

GROUP I

Sheet Brass, Brass & Copper Pipes and Rods—(Approx. Value of Group) $484,000.

Stripping, sheathing and lining pipes, rods, propeller shaft sleeves, liners and roll covers, railings, door-frames, hatch-frames, scuttle-frames, condenser tubes, distiller tubes, feed water heater tubes, evaporator tubes, valve items, pump rods, propeller bolts, air-pump and condenser bolts, engine protective framing, main stern tube and strut bearings.

Castings, Brass or Bronze—(Approx. Value of Group) $793,000.

Propeller hub, propeller blades, bushings, receptacles, shapes, pipe flanges, pipe joints and fittings, brackets and clips for stowage purposes, air pump casings, buckets, circulating water cylinders, stuffing boxes, water pistons, ornamental and miscellaneous castings.

Brass Blading—(Approx. Value of Group) $192,000.

Main and Auxiliary turbine blading.

Electric Cable—(Approx. Value of Group) $340,000.

Copper wire and cable for propelling equipment, power generating and distributing system, lighting, heating, telegraph, telephone, fire alarm and other electrical systems.

GROUP II

Hardware—(Approx. Value of Group) $492,000.

Brass and Bronze Items: Door knobs, hinges, latches, stair-nosings, name-plates, furniture fittings, skylight fittings, steam cocks, tarpaulin and miscellaneous hooks and eyes, screws, bolts and nuts, brackets, braces, cleats, rings, bearings, bushings, slippers, wedges, turnbuckles, special gears and miscellaneous.

Valves—(Approx. Value of Group) $610,000.

Brass and Bronze Items: Globe valves, gate valves, check valves, stop valves, relief valves, surface blow valves, drain, air and water cocks, throttle, sea, and safety valves and manifolds at pumps.

Navigating Outfit — (Approx. Value of Group) $443,000.

Copper, Brass and Bronze Items: Steering wheels and stands, speed controls, engine transmitters, speed indicators, binnacles, compass cases and stands, search-light frames, side light cases and frames, whistles, bells, gears and wiring.

Interior Communication—(Approx. Value of Group) $487,000.

Copper, Brass and Bronze Items: Telephone wiring, call bells, signal bells, watertight bell and buzzer cases, and voice tubes.

Motors and Generators—(Approx. Value of Group) $1,240,000.

Copper, Brass and Bronze Items: Windings, leads, brushes, contacts, name plates, bearings, protecting rods, control switches, resistances and micellaneous wiring.

Electrical Fixtures—(Approx. Value of Group) $652,000.

Copper, Brass and Brass Items: Ornamental hanging lamp clusters and standards, lamp braces and brackets, light sockets, plugs, base sockets, switches, switch boxes, junction boxes, distribution boxes, connection boxes, cases, receptacles and miscellaneous electrical decorative fittings.

Interior Decoration — (Approx. Value of Group) $1,115,000.

Copper, Brass and Bronze Items: Wall scrolls, tablets and decorative plates, grills, balustrades, mantel decorations and ornaments, ornamentations on chests, lockers and other heavy pieces, brass rails, fireplace fenders, andirons and tongs, curtain rods, door catches, knobs, locks, handles and guard rails, hinges, spittoons, clock cases, cleats, hooks, candlesticks and a large variety of miscellaneous items.

Gages—(Approx. Value of Group) $103,000.

Brass and Bronze Items: Casings and tubes for pressure gages, counters, clocks and other similar equipment together with drain cocks, governors and accessories.

Switchboards and Instruments—(Approx. Value of Group) $169,000.

Copper and Brass Items: Switches, fuses, boxes, automatic tripping devices, rheostats, and recorders on main, auxiliary and other switchboards. Control boards for motors, generators and electrical apparatus.

Fire Prevention—(Approx. Value of Group) $293,000.

Copper, Brass and Bronze Items: Portable fire extinguishers, axe holders and case fittings, fire hose nozzles and couplings, fire mains, control valves, fire alarm bells, fire whistles, fire detection tubes and wiring for electric fire alarm system.

Ventilation—(Approx. Value of Group) $400,000.

Copper, Brass and Bronze Items: Electric fans, blowers and frames, brass valves and fittings for ventilation system, gears and wiring.

Metal Airports and Windows—(Approx. Value of Group) $435,000.

Brass and Bronze Items: Airport frames, rings, dead covers, lugs, bolts and nuts, storm windows, window catches, locks, hooks, handles and fittings.

Radio Apparatus—(Approx. Value of Group) $136,000.

Copper Items: Switches, rheostats, indicators, fuses, plugs, receptacles, apparatus and wiring.

Galley and Pantry Equipment—(Approx. Value of Group) $783,000

Copper Items: Saucepans, kettles, coffee, tea and

cocoa urns, sink and slop chute strainers, covers, switches, plugs, contacts, resistances, heating units and wiring incorporated in electric ranges, food chippers, dish washers, meat grinders, potatoe mixers, vegetable parers, egg boilers, toasters and other electrical machines in the galley and pantry.

Zinc. The principal uses for zinc are for galvanizing steels exposed to the weather, in the brass alloys, bearing metals to compensate for galvanic action. The tops and sides of dressers in gallies and pantries are frequently covered with zinc and zinc plates are used around the apertures of single screw ships. The modern propellers have from 35 to 40% zinc. The bronzes will be treated further later on.

Tin. Tin as plating is widely used on ships but its greatest volume is for bearing metals. For instance gunmetal for liners consists of 88% copper, 10% tin and zinc 2%. This alloy is also used for small castings, including pump fittings, and with a higher percentage of tin where greater hardness is required, for worm gears, etc.

The tin base alloy for marine bearing work which may be said to give the most satisfactory results is tin 86%, antimony 9% and copper 5%.

Lead. Now let us see for what purposes these metals are used. With respect to lead, it is employed for floor coverings under toilet spaces, for lead piping, leaded glass, ornamental fixtures and domes. It is also used in red lead and white lead paint and for ballast, bearing metal and solder.

The subject of bearings cannot be passed over without a brief reference to the important part played by lead, as well as several other non-ferrous metals. The following is an analysis of a lead base bearing metal taken from a paper by F. S. Martin read at the Institute of Metals at Liverpool and reported in THE METAL INDUSTRY for Sept. 21st, 1928:

Tin	trace
Antimony	21.2%
Copper	1.4%
Iron	0.04%
Nickel	3.8%
Zinc	trace
Lead	73.6%

Other, more expensive white metal bearings with tin base will be touched upon later.

Aluminum. Aluminum is used principally in the form of cooking utensils in the galley and pantry and for aluminum paint in the interior of the ship.

Nickel. Nickel enters into shipbuilding in a number of ways. Probably the most important use of nickel is in turbine blades and condenser tubes. Both are generally copper-nickel alloys, but pure nickel condenser tubes have been tried with success. In some of the most up-to-date vessels large quantities of copper-nickel alloy piping are used.

Other uses of nickel alloys with a large proportion of nickel are for stair treads, risers, grills, gratings, and nickel plated door-checks, hooks, fittings, and side lights. Monel metal is employed for outside door sills, toe and push plates for pantry doors and places subject to heavy wear. Monel metal is further used for steam table tops and under iced watertanks and similar equipment. Another important use is, of course, in nickel-steel alloys where structural members of high tensile strength are required.

Gold Plate on Stainless Steel

Q.—We are manufacturing pens of stainless steel and have quite a few customers who desire these pens gold plated. We are wondering whether or not you have any information on the gold plating of stainless steel. We are interested in either doing the plating ourselves or having it done by someone who has had experience in this line.

A.—The surface of stainless steel must be given a slightly etched effect before any electrodeposited metal will adhere. The etching need not be sufficient to destroy the lustre of the steel. The general practice is to use a 5% hydrochloric acid electrolytic pickle after the steel has been thoroughly cleaned in alkali solutions. The work is used as the anode for a few minutes, the time depending upon the composition of the alloy. Steel pens are generally plated in bulk, and it is probable that it would be necessary to string the pens on a wire in this method. This may not be economical. G. B. H.

Evening Course in Electroplating

The course in practical electroplating at the College of the City of New York starts a new class on February 8, 1932, under the direction of Dr. L. C. Pan. It is open to all persons interested in electroplating, metal finishing and chemical control of plating solutions. The class will meet Mondays and Wednesdays from 7 p.m. to 11 p.m., in the Chemistry Building, Amsterdam Avenue and 139th Street, New York City. The materials covered by the courses are as follows:

1. Fundamental principles of modern electroplating.
2. A critical study of present-day practice in electroplating of various metals and alloys, including copper, nickel, chromium, cadmium, zinc, brass, iron, lead, tin, silver, gold, platinum and rhodium.
3. Physical and chemical methods of control, including simplified methods of analysis and preparation of standard reagents.

Laboratory work constitutes an important part of the course and is arranged flexibly, to meet the individual needs of each student.

Registration may now be made evenings in person or by mail.

Recovering Battery Lead

Q.—Can you give us any information regarding the recovery of lead oxide from battery plates, and equipment necessary for same? We have a reverberatory furnace with which we are recovering battery lead, and thought possibly we could recover the lead oxide also.

A.—After a rather exhaustive search, we are compelled to conclude that there is no commercial method for recovering lead oxide as such from scrap battery plates. Of course, in the process of recovering the lead from the plates, a large proportion of the lead oxide is reduced and metallic lead reclaimed from the oxide as well as from the lead plates themselves.

The best discussion of this process which we have seen is that by E. R. Thews in his book, "The Metallurgy of White Metal Scrap and Residues," published by the D. Van Nostrand Company, New York. While you are undoubtedly familiar in your own work with all of the details of this process, you may find it interesting and worth while to read Mr. Thews' discussion of it.

H. M. ST. JOHN.

The Metal Producing Industries

A Symposium on Their Record in 1931 and Prospects for 1932

Copper

By
W. A. WILLIS
Manager,
Copper and Brass
Research Association
New York

INDUSTRY, today, must be keenly alert to trends. An intensified spirit of progress is speeding acceptance of much that is new and novel, provided the attainment of "something different" can demonstrate practical results. Tradition and convention in industry must be resilient to this urge for change.

The public, through various media, is kept so fully enlightened that no form of progress reacting to public advantage escapes attention. A new scientific discovery is a laboratory marvel, today. Tomorrow its principles are being practically applied to furthering the convenience, comfort, or pleasure of the people.

We can see, everywhere about us, the changes effected by the high pressure of progress. They are, for example, particularly to be noted in building construction. The architectural world has had a resurgence of the creative spirit. It is originating types of architecture as distinctive as the masterpieces of past ages, and with this difference. They are appropriate to modern requirements and are constructed with a new conception of the use of materials.

The trend is toward lighter construction. Metal is being employed more largely for vertical construction that formerly was of heavy masonry. This trend is of importance to the copper industry. A rustproof metal, one that assures avoidance of repair and upkeep expense, is essential for exposed construction. Copper has a background of centuries of service to prove its lasting qualities. It is being used as spandrels on wall surfaces in much of the new major American construction.

It might seem presumptious for me to forecast a day when all-metal buildings will be a commonplace instead of a novelty. But when I do so I am only expressing the vision of many of the country's leading architects who contend that such structures are the logical buildings of the future. Metal walls, especially of material so ductile as copper, would lend to ease of fabrication, speed of erection, and rapid demolition, removal and re-erection of a structure should a change of location be necessary.

As a matter of fact, European countries have made a marked advance in just that type of construction. Many large metal buildings, their exteriors, excepting, of course, window space, all of copper, are to be seen in foreign cities. One, a nine-story building covering an entire block, recently was completed in Copenhagen. It is, I understand, the largest commercial building in the city.

Another important structure, a church built of copper and glass over a light steel framework for exhibition at the Cologne Fair, lately was taken down, shipped, and re-erected on a permanent site in Essen, Germany, all within a period of a few weeks. A German firm manufactures copper houses which can be shipped in sections and set up in a day or two. These are of various designs and are architecturally attractive. This firm sold several hundred of its houses at the recent Colonial Exposition in Paris.

The introduction of such houses into American use is almost a foregone conclusion. Personally, I know of some large concerns that are planning mass construction of metal houses for sale in the United States.

Naturally, in departing from the conventions of the past, architects are striving for new harmonies in design. We see these exemplified in noted new structures by a blending of silvery metal with light-tinted masonry. The copper industry has met this trend with lead-coated copper which affords the time-proven service of copper together with color tones for the new harmony which architects are employing so effectively. In many important cities fine examples are now to be seen of lead-coated copper spandrels combined as major elements of design with the masonry of new skyscrapers. Lead-coated copper also is much in favor for the roofing of large buildings and is largely used for ornamental gutters and leaders on fine residences.

It is not my purpose to refer to the amazing number of uses of copper in industrial and other activities. But it will be interesting, perhaps, to emphasize that apparently insignificant outlets for any industry's product are not to be disregarded. For example, manufacture of brass pins alone, today, consumes annually several times as much copper as was required by all American industries in 1832.

I mention this because there is a new trend, today, of which the copper industry is taking advantage, a trend that promises a considerable outlet for the metal. It is the vogue for metal tableware and ornamental pieces in the home. Pick up any newspaper and you will note that the big stores are enthusiasts for copper ware. Copper tea sets, copper or brass bowls and trays, candlesticks, book ends, and a hundred other copper articles have right of way in the advertising pages. Fabricating units of the copper industry have been doing wonders in the production of artistic pieces and the public is proving receptive in a big way.

It is a far cry from copper mining to afternoon teas, but when the cup that cheers promises to put copper into a million homes, you have a trend that causes a billion-dollar industry to take notice.

Zinc

By A. E. MERVINE

Manager, Metal Division, The New Jersey Zinc Sales Company, New York

THE year 1931 has been in some ways uninteresting for the zinc industry as well as many others, but there are many possibilities ahead.

Most of the zinc produced is used in zinc coating or galvanizing. The activity of the American Zinc Institute in pressing the advantages of heavily coated zinc sheets is, therefore, directly concerned with the increase of the use of zinc in this field. For special zinc coating jobs where forming is done after galvanizing, it is best to use high-grade zinc. It is interesting also that the large suspension bridges, from the old Brooklyn Bridge to the new George Washington Bridge, have all used Horse Head high-grade zinc to protect their cable wires.

The low prices of copper and zinc at this time is making brass attractive in cost for a great many uses in which formerly it could not compete.

Rolled zinc has found new outlets. The electrification of eastern railroad lines calls for a considerable amount of signal cable wrapping. Zinc has been found increasingly useful in radios because of its non-magnetic properties. The production of such seemingly trifling items as eyelets, grommets, shoe lace tips, etc., makes up an extraordinary tonnage which is surprisingly stable. The amount of rolled zinc used in automobile running board molding is increasing steadily.

One of the fields with the brightest future for zinc is die casting. With the new alloys which have eliminated the objectionable properties of warping and aging, and with the smooth finish upon which, with very little work, any type of bright or fancy electroplated coating may be applied, the use of zinc die castings is growing steadily in many fields.

Considerable progress is also being made in zinc pigments and paints.

There is at this time throughout the zinc industry a clearly defined co-ordination between sales, research and production which can only mean progress. And where the characteristics of materials are as interesting as zinc metal, alloys and pigments, such a progressive spirit means continued expansion.

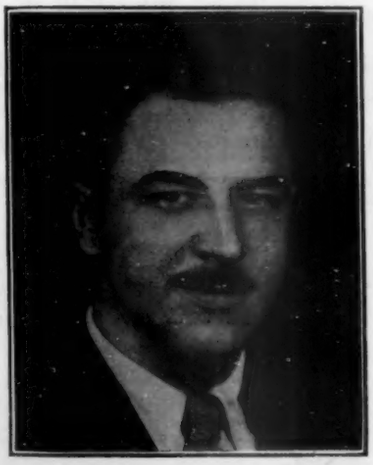
Tin

By

C. L. MANTELL

Consulting Engineer

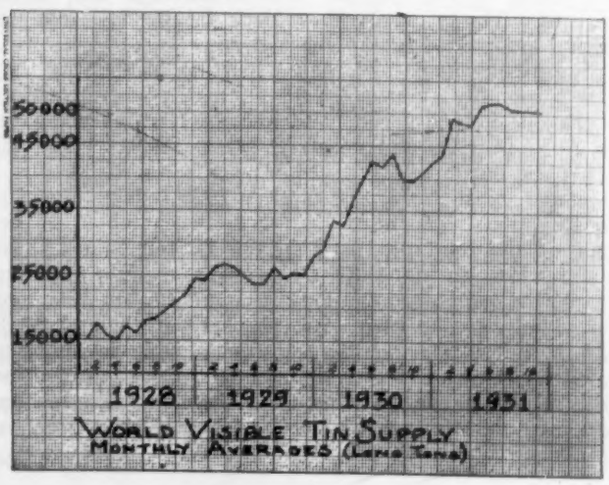
Brooklyn, New York



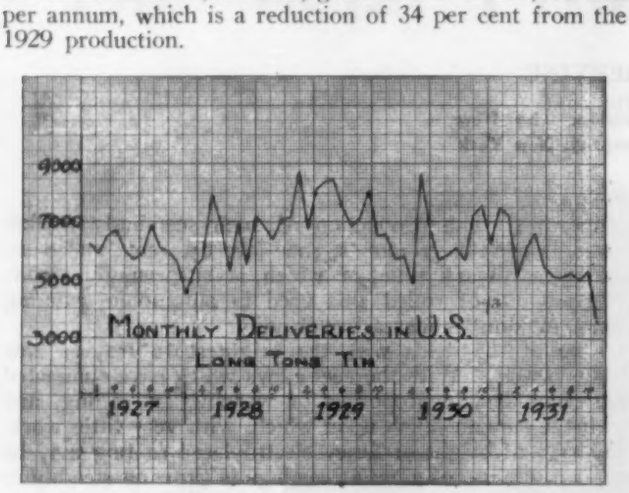
THE year 1931 has been very disheartening for the producers of tin metal. A great deal of printer's ink has been used in outlining agreements for control, restriction of production, elimination of surplus, and finding of new markets and outlets for the metal. It is difficult to find results in any direct proportion to the volume of discussion.

Restriction of production and international control has had to meet many obstacles. When control was established in January, 1931, it was found impossible to make the plan effective in Malaya, the major producer, for the first three months. It has been claimed that control has been so effective that deliveries for the three months ending November 30, 1931, exceeded supplies, even despite the heavy fall in American deliveries. Attempts to bolster the market by the formation of tin pools which purchased metal cannot be judged as to their success until normal conditions are restored.

About the middle of December, the International Tin Pool held 19,000 tons of tin metal. It is planned that the scheme continue in operation for a period of three years from August 12, 1931. The metal is to be released at a minimum price of £165, at which price an initial amount of five per cent of the pool's holding may be released for sale if and when this shall have been the average price of spot tin on the London Metal Exchange during any completed calendar month. The next ten per cent may be released at a corresponding price of £176 per ton. At the present time it is contemplated to hold the world's annual production at 105,775 tons, distributed as follows: Malaya 45,290; Bolivia 28,813; Dutch East Indies 25,154; Nigeria 6,518. The original quota of



125,773 tons as of March 1, 1931, represented a reduction of 22 per cent from the 1929 production. The present quota, if the production of non-participating countries be estimated at 20,000 tons, gives a total of 125,000 tons per annum, which is a reduction of 34 per cent from the 1929 production.



Over the period of 1928-31, despite numerous efforts to control production, the world's visible supply of tin metal has continued to increase so that it is now in the neighborhood of 50,000 tons compared to 25,000 tons in 1929. The monthly averages in long tons are plotted on page 5. Over the five-year period of 1927-31, monthly tin deliveries to the United States have fluctuated appreciably, as in the chart above. During 1931 the monthly average of tin deliveries has been steadily going downward, so that in the latter part of 1931 the deliveries were lower than at any time during the last five years. The estimated tin deliveries in 1929 to the United States were 89,110 tons for the whole year, 78,225 tons for 1930, and approximately 63,000 for 1931. This represents a 15 per cent reduction in 1931 as compared to 1930, and about a 30 per cent reduction compared to 1929.

Tin prices over the period of the last five years have dropped steadily. The high for 1931, 27.5 cents a pound, occurred on March 17th, the low of 20.6 cents on December 7th. These compared to a high of 39.75 cents and a low of 23.5 cents last year. An interesting feature of the tin price in recent months has been an apparent rise of price in London in terms of pounds Sterling and a fall in price in New York in dollars. The British pound in terms of dollars has fallen more rapidly than the price of tin, and as a result a greater number of pounds Sterling are needed to purchase a ton of tin. In this manner the apparent rise in price during the year of tin metal on the London Metal Exchange can be explained. Tin prices in New York for the last five-year period are plotted in the chart at right.

Figures available over only a portion of the year indicate a monthly average consumption of about 2,000 tons of tin in tin and terne plate manufacture, as compared to 2,230 in 1930 and nearly 2,400 in 1929. The small pea pack during 1931 of 13,285,826 cases of 24 No. 2 cans as against 22,035,212 cases in 1930 reduced tin plate consumption. The figures given represent about 97 per cent of the total pea pack in the United States. Tin plate prices during 1931 were lower than in previous years, the present quotation being $4.75 per base box for standard coke plate, f. o. b. Pittsburgh, and $4.85 f. o. b. Gary. During the year considerable development work was carried on in reference to tin plate production with a view to the manufacture of better steel, improved pickling, and the use of steels with small per cents of alloying constituents to replace black plate as a base for tin plate. A producer brought forth a "rust resistant" tin plate made of copper-molybdenum iron coated with tin by hot dipping methods. Perhaps the outstanding development during the year was the tin plating of cast iron pistons in automobile engines. Tin plating the pistons allows better fitting in the cylinders, takes care of out-of-roundness of the pistons, and allows the production of engines giving better performance. Originally developed by one of the General Motors divisions, tin plating of pistons has spread to a number of other makes of cars where aluminum pistons are not used.

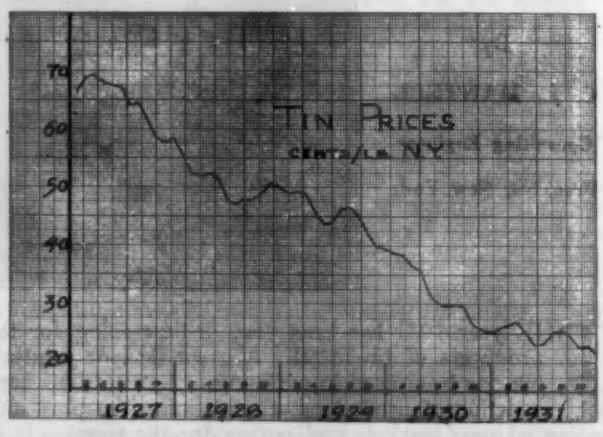
Improvements of both metallurgical and mechanical natures have taken place in hot dipping. Long sections of copper tubing with very smooth tin surfaces for refrigerator coils can now be produced by hot dipping. These compete with block tin tubing. Retinners have at times found themselves in price cutting wars. Substitutes for hot tin dipped milk cans in the shape of aluminum and corrosion resistant alloys of the stainless and the 18 chromium 8 nickel types made little progress because of the low prices of tin coated containers.

Operations of detinning plants were conducted at fair volumes but were handicapped as the result of low tin prices. The detinner has to treat increasing amounts of tin plate scrap which has been coated with enamels, paints, varnishes, lacquers, and lithographing inks and constantly has the problem of removal of these extraneous materials at as low a cost as possible with a minimum loss of tin incidental to the operation of cleaning.

In the use of tin salts in textile mills, considerable attention has been paid to the recovery of tin compounds in wash waters and waste liquors. There are indications of recovery cycles of tin compounds in the wash waters involving the conversion of these substances into usable materials at the textile plant, eliminating the delivery of waste to plants which recover the tin by metallurgical methods.

The year has seen further development of electrolytic tin plating, perhaps the most interesting being the extension of application of the acetate-stannate bath.

The New York Stock Exchange quotations of the can-making companies are at the lowest figure for a ten-year



period. It is questionable as to whether these low evaluations of the common stocks of the can manufacturers are warranted.

A more or less general feeling is found among tin producers and consumers that sooner or later prices of tin metal will rise and perhaps, due to various forces and factors, be somewhat stabilized in the neighborhood of 45 cents a pound. No one, including the writer, has as yet been bold enough to prophesy how long a time will be needed for this price recovery to take place.

Lead

By

FELIX E. WORMSER

Secretary, Lead Industries Association, New York

IN common with raw material markets in general the price of lead showed a progressive decline during 1931 establishing a level at the end of the year lower than anything experienced since early war days (1914). The year 1931 opened at 5.10c. per lb. New York and ended at 3.75c. (Dec. 15th). Naturally the persistent decline had its effect upon production, mine after mine lowering output rather than forcing production upon an unwilling market, or closing down altogether as the price of lead became lower than cost of production. Unfortunately it takes considerable time for a reduction in output to manifest itself in the actual merchantable supplies of lead and the adjustments made were not sufficient to overtake the constantly dwindling demand for the metal.

Production of lead from domestic ore in 1931 is estimated at 430,000 tons compared with 580,000 tons in 1930, and 686,000 tons in 1929. The record for 1931 brings production back to where it was in 1913. Sharp as the reduction has been, any further recession in business will probably see further curtailment by the miners as they find themselves unable to meet the market for their product. On the other hand production of lead is so low now that it is far below what might be considered the normal minimum appetite of the country. Hence it is quite logical to assume that it will not long continue at so depressed a level. After all, there is a certain rock bottom level of consumption of the American people necessary to feed, clothe, shelter and serve them. Lead is an essential for meeting a lot of those requirements, directly or indirectly.

For the second year in succession the amount of new lead used in cable manufacture leads all other outlets for the metal, storage battery manufacture ranked second. If, however, the amount of scrap lead and lead oxides used by battery manufacturers is taken into consideration, the overall consumption of lead in storage batteries stands well above that used by cable manufacturers.

The extent to which the demand for lead disappeared in 1931 is vividly shown by the fact that consumption of lead for cables was only about 105,000 tons compared with 195,000 tons in 1930.

Technical developments in the use of lead products have not been particularly conspicuous in amount or significance. Lead has a diversity of useful qualities that have not been fully appropriated in industry. For example, its extraordinary durability in atmosperic surroundings is unsurpassed by any other common metal, and yet it is used only to a minor extent as a coating on other materials. However, it is noteworthy that the use of lead coated copper is spreading steadily in the United States in the building and construction field as a roofing, flashing and decorative material. The architect is thus being provided with a more intimate appreciation than he now generally possesses of the attractive gray color of lead and its other virtues such as freedom from discoloration of the masonry or woodwork with which metal may be used. It is quite true, however, that many leading architects have long been familiar with the usefulness of hard lead as a building material and have specified it freely for roofs, spandrels, flashing and other installations.

Leaded greases appear to be finding a ready market in certain industrial applications. Although nothing fundamentally new, it is only in the last few years that the development of leaded greases has been stimulated by the requirements of new mechanical gear design. For example, hypoid gears now used in some automobiles operate under tooth pressures as high as 48,000 lb. per sq. in., compared with the 10,000 lb. per sq. in. in ordinary gearing. Under the higher tooth pressure the usual lubricant breaks down whereas lead oleate, the general form of the lead constituent of the grease, readily stands up. Lead oleate is one of the "oiliest" substances known.

A method of removing scale electrolytically from ferrous articles and protecting them from oxidation by the deposition of a thin film of lead has been developed and is known as the Bullard-Dunn process. It is done in a chloride-sulphate bath using a lead anode and the articles to be cleaned as cathodes. The process has possibilities in the lead coating field.

The use of lead-covered cable has been extended to the heating of hotbeds in forcing growth of flowers and considerable interest has been aroused in this new aid to some specialized branches of agriculture.

Lead's anti-vibration qualities continue to be better appreciated, both in lead-asbestos anti-vibration mats for skyscrapers and also beneath moving machinery such as printing presses, rubber manufacturing machinery, and the like. Sheet lead alone is being experimentally tried in connection with the design of a new rail joint and track construction for heavy traffic, the sheet lead being placed beneath the rail and over a specially designed plate resting upon the wooden railroad tie.

In the alloy field the combination of lead with some of the alkaline earths such as calcium, remains a fruitful source of experimentation. By careful investigation the fatigue limit of soft lead has been established by one large user at 200 lb. per sq. in. Research on the same problem by another company has placed the limit at 275 lb. The differences might be attributable to slight variations in the quality of the lead used.

Further data upon the new British lead-cadmium-antimony and lead-cadmium-tin alloys indicates that they possess valuable properties. The two ternary types that have been developed in England for commercial use each contain 0.25 per cent cadmium, but one class also contains 0.5 per cent antimony and the other 1.5 per cent tin. Owing to the higher tensile strength of these alloys compared with soft lead it is claimed they may be used in lower weights for the manufacture of lead pipe for the same working conditions and in roofing materials so that, even though the unit cost per lb. of the ternary alloys is greater than soft lead, the reduced quantities that may be used for the same working pressures make up for the difference.

Alloys of lead and 20 to 65 per cent thallium have been studied and found to be among the most insoluble alloys known. The high price of thallium prevents general application of the alloys, such as providing highly acid-resistant plated surface for iron, steel and brass.

The effect of cold rolling and heat treatment on 14 alloys of lead containing small additions of tin, cadmium or antimony have been studied by the British Non-Ferrous Metals Research Association. Cold-rolling hardened

the soft alloys and softened the hard alloys. Suitable heat treatment re-hardened the lead-antimony-cadmium alloys after being softened by rolling. It was found that cold-rolled 7 per cent antimony-lead alloy is very little harder than cold-rolled 1 per cent antimony-lead alloy.

The result of an investigation of antimonial lead for storage battery grids was reported during 1931 by Crennell and Milligan. Their conclusion was that the 5-12 per cent antimonial lead alloys extensively used for grids suffer from drawbacks from which lead alloys containing smaller amounts of antimony are free.

Composition lead foil is being used experimentally in combination with asphaltic paints to protect petroleum pipe lines from corrosion when buried in the ground. The foil is also being tried as a protective coating on the tops of oil tanks. The spectroscope is being used by analysts of metallic lead products and the technique of its use has been given much study in 1931.

Aluminum

By S. K. COLBY

Vice-President, Aluminum Company of America, Pittsburgh, Pa.

DEPRESSED business activities in 1931 have affected aluminum in the same way that they have affected other basic commodities. Curtailed production has been the rule rather than the exception. However, the picture has a bright side in the scores of new uses for aluminum which have been developed within the past twelve months, and in the amplification of a number of already established outlets.

The trend toward modern metals in architectural fields continues, and in many of the buildings constructed during the past year, aluminum plays a prominent part. Typical of this is the new building of the First National Bank, at Oklahoma City. This interesting structure utilizes aluminum for spandrels, window jambs and sills and ornamental entrance trim. The structural work in the beacon tower is fabricated from aluminum structural shapes while aluminum sheet is used for sheathing the tower and for the batten seam roof.

Another example of the increasing use of light alloys in modern architecture is seen in the Marshall Field Building, now in process of construction in Chicago. Upon completion, approximately six hundred thousand pounds of aluminum will have been employed in this building for spandrels and windows.

One of the branches of the aluminum industry which showed an encouraging increase in sales for 1931 over the 1930 figure, was the aluminum chair field. The use of these light, serviceable metal chairs is rapidly gaining a foothold in all manner of public buildings. The year's installations included the selection of 3,100 of these chairs for the Waldorf-Astoria Hotel in New York. Restaurants, hospitals, department stores, schools and other public buildings are specifying aluminum chairs in increasing numbers.

No less interesting are developments in the electrical industry. One of the outstanding items of the year was a new type of aluminum busbar made of aluminum channel section, which combines greater structural rigidity with extremely high load carrying capacity. The "box-girder" square construction of this new conductor makes its use feasible in many places where flat bar conductors are not practical.

The completion and successful trial flights of the airship "Akron," or ZRS-4, marked an epoch in lighter-than-air achievements. The giant air liner utilizes strong aluminum alloys for frame work, fin sections, airplane launching mechanism and numerous other parts. Work on the ZRS-5, sister ship to the "Akron" has been started. This ship is also to be constructed principally from aluminum alloys.

In heavier-than-air development, aviation companies continue to use large quantities of strong aluminum alloys in plane construction. The possibility of substituting spot-welding for rivets in the joining of parts is now under experimental consideration. This method of joining aluminum, after it has been developed to a point of commercial practicability in aircraft manufacture, will undoubtedly lead to a reduction in construction costs with no sacrifice of strength, and result in still more extensive applications of aluminum in future planes.

In land transportation, confidence in aluminum continues to increase. The year has witnessed the design of the all-aluminum Pullman car, while the rolling stock of the country has been augmented by many types of food, oil, and chemical carrying tank cars of aluminum construction. The Alcoa Ore Company recently placed in service ten 70-ton hopper cars with aluminum bodies. Railroad men are watching this experiment with interest. Equally important is the application of aluminum in the construction of modern electric locomotives.

In the electric railway industry too, statistics show not only a greater number of aluminum cars in service, but a more complete aluminization of the newer cars.

Despite the depression, the year 1931 has seen more aluminum employed in truck and bus body construction than ever before. Aluminized trucks are now represented for use in practically every branch of industry from petroleum to pianos. One of the past year's outstanding developments along these lines is seen in the new aluminum milk truck tanks which are rapidly gaining popularity in the dairy industry.

Not only bodies, but chassis as well, are being lightened in this manner. There are a number of trucks on the market at the present time, in which aluminum is used, not only for the bodies but for numerous other parts, including cross and longitudinal frame members, rear axle and differential housing, rear axle trunions, cabs and hoods.

An increase in the use of aluminum foil in many well established fields and the development of a variety of new uses for this product were apparent during 1931. The chief use for aluminum foil, of course, is in the packaging industry where it is extensively employed as a wrapping material for candy bars, yeast bars, chewing gum, tea, cigarettes, gift boxes, photographic film and a variety of other items.

The year 1931 marked also the further development of aluminum foil as an insulating material. The foil is arranged in layers separated by air. This type of insulation, which depends on reflection rather than a minimum of conduction, is effective at temperatures ranging from sub-zero to almost the melting point of aluminum. At

the same time, the fact that a cubic foot of foil, used in this manner, weighs only a small fraction of the weight of a similar volume of cork, makes it particularly applicable where weight reduction is an important factor. Its chief use to date has been on shipboard where it is employed as an insulation for bulk heads, steam pipes, and numerous other parts. It is also used as insulating material for refrigerator cars on railroads and as an insulation for bodies of refrigerator trucks.

The close of 1931 finds aluminum well established in the dairy industry. Aluminum foil milk bottle caps and all-aluminum milk cans are now commercial realities, while aluminum foil butter wrappers are rapidly gaining recognition.

Oxide finishes for aluminum were developed to a higher degree of utility during the year. The process involves oxidizing the aluminum by a special electro-chemical process, and then dyeing the surface or finishing it in some other manner. It is possible to reproduce practically any shade or color on the surface of the aluminum. The oxide coating is hard and abrasion-resisting and gives excellent serviceability at comparative low cost. Tests indicate that an oxide coating .0004 inch thick is several times more resistant to abrasion than five coats of enamel. This finish is finding ready application to many articles where attractive appearance is combined with low cost.

The past year has seen the development of a new alloy, which combines many of the properties of the high strength alloys with the more ready workability of unheat-treated aluminum. This alloy contains about 1 per cent each of magnesium and manganese. It is not susceptible to heat treatment, and cold working is relied upon to produce the desired improvement in characteristics. Its ready forming properties in the annealed temper, together with its ability to harden, make it valuable for forming articles which require a workable material in the forming, but which must be stiff enough to resist permanent deformation.

The most important application of this new alloy to date, has been in the erection of pilaster sections for the the new Municipal Stadium at Cleveland. The choice was influenced by the need for a metal that would not only resist corrosion and weathering to an unusual degree, but would at the same time resist deformation under heavy wind loading. It is also finding use in bus and railway car construction, where it is being employed for side and roof sheathing, in the electrical field, where it is being used for light sockets and underground cable covering, and in the field of fabricated articles, as a material for washing machine tub covers, trays, ruler edges and other items.

Aluminum paint continues its extensive applications in the building industry. Mill priming of lumber products with aluminum paint has interested manufacturers of wood commodities for years. The past year has seen the practice well established, with many manufacturers, located throughout the States, protecting their lumber in this manner. During the past twelve months, aluminum paint has found an increasing number of uses as a protective coating for machinery, oil tanks, conveyor pipes, smoke stacks and numerous other metal structures. Factory owners in many States brighten and preserve their walls and ceilings by the use of this metallic paint. Its use on highway bridges is standard practice throughout the southern States as well as in New England and in many of the middle west and far western States.

The use of aluminum bronze power in the manufacture of metallic ink is also expanding. Aluminum ink printing finds favor among advertisers because of its unusual attractiveness and appeal.

Among the many new uses might also be mentioned window screens. During the year past aluminum alloy screen cloth has been available to the home owner and builder through the hardware merchant. Its principal advantage lies in its not staining adjacent light colored surfaces. Aluminum bodies for stringed instruments have also been perfected and marketed. The best musical critics have pronounced the tone equal to that obtained from the highest grade of wood, with the advantage that metal will not split and warp. Aluminum will undoubtedly find wide application in the musical instrument field.

Nickel in Non-Ferrous Alloys

By
ROBERT C. STANLEY
President,
The International Nickel Company of Canada, Ltd.,
New York

ALTHOUGH the nickel industry has shared with industry the world over the disappointments caused by the delay in business recovery, developments during the past year indicate a continuing growth of diversity in uses, which will be more generally appreciated as industry steadily works its way back to normal volume. This widening circle of nickel applications is reported in some detail in the later paragraphs of this review of the year.

Pure Nickel Applications

On May 25, 1931, the Vatican State currency became legal tender throughout Italy. Included in this currency are 234,000 pure nickel coins in denominations of 20 and 50 centesimi and of one and two lire. The Vatican State is the twenty-fourth nation to include pure nickel tokens in its official currency, some 3,000,000,000 coins having been struck from this metal since the Swiss government first adopted pure nickel coinage in 1881.

Nickel-clad steel, which had its experimental development in 1930, commenced to fill a definite place during 1931. Its principal use is in tanks of heavy construction, in which are handled materials corrosive to iron and not corrosive to nickel. It has been used as the body sheets of caustic evaporators which are fitted with nickel tubes, making the whole process of evaporation possible without contact of the caustic with steel or copper. Its use in tank cars for caustic has been extended.

One of the most important developments of the year in nickel plating has been the beginning, under the aus-

pices of the Research Committee of the American Electroplaters Society, of a program of exposure tests and the development of standardized specifications for plated products and for raw materials.

Nickel plating in solutions of low Ph. (i. e. high hydrogen ion concentration) is being used successfully by one of the large automobile producers in many of its plants. This bath is more acid than that commonly employed by platers, permits them to plate faster and get more production out of a given amount of equipment, the resultant plating being much more resistant to corrosive attack of the base metal underneath it.

While competitive in one sense, chromium plating is maintaining a market for nickel, as the chromium finish is most successful where it has been plated on a comparatively heavy nickel plate as base.

Monel Metal

The position of Monel Metal in the field of food handling equipment was strikingly demonstrated by two installations made during 1931. These were in the kitchens of the Empire State Club which has its quarters in the Empire State Building, and in the kitchens of the new Waldorf-Astoria Hotel.

Similarly, in the field of washing machines this special nickel-copper alloy further established its leadership. More than 17,000,000 pounds of Monel Metal in laundry plant equipment are now in service, and the important washing machine manufacturers have standardized on this alloy. The Federal Specifications for Laundry Appliances, issued on April 28, 1931, do not use the trade name of Monel Metal but specify nickel-copper alloy.

Seamless Monel Metal tubes, heretofore available only in welded form, are now commercial products and have all the desirable physical properties of drawn Monel Metal. The introduction of seamless tubes has simplified many forming operations to which the welded tube is not well adapted, as for instance coiling, expanding, etc. By eliminating the weld in tubes the danger of failure by local corrosion in the weld area has been eliminated. Seamless Monel Metal tubes probably will find general application for heating coils in dye baths and other corrosive liquids.

As a result of tests made during last year the suitability of Monel Metal for bolts, screws, and miscellaneous fittings on outdoor electrical equipment, such as railroad electrification systems, railway signal equipment and transmission lines, appears in a different and improved perspective. These tests have centered around strength-ductility relationships, and the behavior of metals under combined stress and corrosion.

To meet the demands of engineers who consider Monel Metal the standard material for the combination of higher corrosion resistance and higher strength among non-heat treating alloys, rapid developments have been made in supplying Monel Metal forgings to give specified physical properties.

Usually the demand is for increased tensile strength, and it has been possible to produce regularly forgings in Monel Metal on a basis of 45,000 lbs. minimum yield point. Such forgings are supplied to a leading manufacturer of high speed centrifugal machinery for separating liquids, as well as to the United States Government for parts of ordnance apparatus.

The development of high strength Monel Metal forgings, in conjunction with availability of particularly high strength Monel Metal spring wire, has increased interest among engineers in the availability of this corrosion resistant material for engineering applications where strength is important.

In 1931 a special Monel Metal spring wire has been developed, that has a higher spring quality and can carry a greater load. Springs of this material are being used for conditions where corrosion must be prevented and where higher temperatures are used.

Concurrently with the introduction of carbon tetrachloride as a solvent for dry cleaning, Monel Metal and nickel came into general use for the dry cleaning equipment which is built of metal. The nature of the carbon tetrachloride dry cleaning process requires the use of metal equipment which must be corrosion resisting, as carbon tetrachloride has a slight tendency to hydrolyze, forming corrosive hydrochloric acid. These metals were selected after extensive tests which clearly indicated their superiority over other corrosion resisting materials. Apart from their corrosion resistance, Monel Metal and nickel have an additional advantage over other metals inasmuch as they may be fabricated more readily in the construction of the dry cleaning equipment.

Producers of rayon by the Viscose process have displayed an increasing interest in nickel and nickel alloys. Among the important uses of Monel Metal and other nickel alloys are drive shafts for spinning machines, fastenings of various kinds, parts of machines for washing rayon, and machinery used in dyeing. There is a general trend toward more efficient operation of spinning machinery which brings a metal problem into a very prominent position. It is too early yet to say what the outcome will be, but there is good reason to believe that nickel alloys will play an important role in the construction of new machines and in the alteration of old equipment.

Two important developments in the marine field during the past year have been an increased use of Monel Metal for the propellors of small and medium-sized craft, and an increasing use of Monel Metal nails for fastening the wood planking on the hulls of vessels. In both these uses the corrosion resistance of the alloy is its outstanding property, with its strength important as well.

70/30 Copper-Nickel Tubes

Within the last year the cupro-nickel condenser tube has had a very marked impetus through the realization, on the part of the shipping companies in this country, of its merit for the more corrosive sea water conditions. This interest has extended as well to the engineers of power plants operating along the seaboard. Cupro-nickel tubes of fine quality are now being furnished in large quantities by American producers. New ships of the United States Lines, Roosevelt Line, Canadian Pacific Steamship Company, the United States Navy and the United States Coast Guard, are being or have been equipped with them.

Hastelloy Alloys

The important nickel base alloys known as the Hastelloy group, have been used to a greater extent than ever during the past year. The grade known as Hastelloy A has found considerable use in the handling of hydrochloric acid for which purpose it was developed. Hastelloy C, a casting alloy, has been found to be extremely useful in contact with solutions containing free chlorine and with acid solutions containing corrosive ferric and cupric salts. Hastelloy D, another casting alloy, has found its greatest field of use in the concentration of sulphuric acid for which purpose considerable quantities have been used in the form of 7" and 16" diameter cast pipes.

The year 1931 has been notable for the increasing trend in both architecture and interior decoration towards the use of the so-called white metals which are rustless and corrosion resisting. These alloys depend largely upon nickel content for properties which make them popular.

White nickel alloys have been used in modern office buildings, banks, libraries, and hotel constructions for hardware, window frames, store fronts, spandrels, grilles, elevator trim, hand rails, balustrades, mail chutes, bank cages, counter desks, baseboards and embossing effects.

This trend has also been responsible in standardizing plumbing fixtures for all buildings of the monumental type on the basis of solid nickel silver, a non-ferrous alloy with 20% nickel content. All Government buildings involving a construction cost of $1,000,000 or more now specify this alloy for the plumbing fixtures.

Two important steps were taken during the year to improve the conditions under which nickel and Monel Metal welding is carried on. At our laboratory at Bayonne, N. J., there has been developed the "T" Nickel Welding Wire through the control of the elements which influence fluidity, porosity, strength and deoxidation. Reports from the field are that this wire is giving consistently good results in both gas and electric welding.

To do satisfactory electric welding on Monel Metal, nickel or nickel clad steel, it is necessary to have the welding rod properly coated with a flux to make for arc stability, fluidity and deoxidation. Both the nature of the flux and the manner of its application are important factors. Hence the company is now producing under its own control and supervision a satisfactorily coated wire for electric welding.

The Precious Metals

By

G. H. NIEMEYER

Vice-President, Handy and Harman

New York

IN the absence of definite figures, it is estimated that the amount of gold used in the Arts and in Industry during 1931 will show a decline of from 25 to 30% as compared with 1930.

A considerable falling-off in the manufacture of gold jewelry was the principal factor in the decline, although noticeable decreases are apparent in the optical, dental and other fields. The continued demand for cheaper grades of jewelry stimulated the production of rolled gold and electroplate, but altogether it would seem that less gold was used in the Arts and Industry in 1931 than in any year since 1915.

The world's production of silver in 1931 is estimated at 196,000,000 ozs., which shows a falling-off from last year's figures of 20½%. The United States supplied 31,400,000 ozs., Mexico 88,900,000 ozs., and Canada 20,400,000 ozs. The heaviest decline in production was that of the United States, which showed a decrease of 38% under 1930.

Consumption of silver in the Arts and Industry is estimated by us at 30,500,000 ozs., an increase of about 1,000,000 ozs. over 1930. More than 50% of the silver used in the United States and Canada goes into the production of sterling silver articles and the substantial increase in the consumption over 1930 is due to the increased use in this field.

The price of silver bullion is not such an important factor in the production of the finer grades of sterling silverware, where art and craftsmanship are the principal items of cost. However, the price level of silver has affected the selling price of sterling silver table and decorative wares in the medium or low-priced fields and considerable additional business has been developed which will undoubtedly continue to expand as long as the price of silver bullion does not advance materially. The increased use of sterling silver in the manufacture of jewelry is also noted.

Consumption in the photographic and chemical fields has remained at about the same level as in 1930, but there was a falling-off in the use of silver in the plated-ware industry and general business conditions handicapped the development of the use of silver for soldering and brazing in the industrial field.

While statements have appeared in the public press from time to time that new uses could probably be found for silver because of the lower price, and while considerable money is being spent for research, no new uses of any consequence have been found. It should be borne in mind that silver is expensive compared to the cost of base metals. 30c per troy oz. for pure silver is equivalent to $4.37 per avoirdupois pound.

It has also been suggested that a non-tarnishing silver alloy might be developed. While considerable money has been spent and prominent metallurgists have become interested, no non-tarnishing sterling silver alloy has been discovered. Tarnish-resisting sterling silver alloys and alloys of lower silver fineness which have been produced do not compare favorably in some of their physical properties with the standard sterling alloy.

Platinum imports declined slightly for the first ten months of 1931. Department of Commerce figures for this period are 86,472 ounces which is 1,410 ounces less than in the preceding year.

Iridium imports were very much lower, the figures being 1,778 ounces in 1931 against 4,675 ounces in 1930, a decline of almost 62%.

On the other hand, palladium imports were considerably higher, figures for 1931 being 23,423 ounces against 17,174 ounces for the same period in 1930, an increase of 36%.

Platinum prices declined steadily from the opening quotation of $36.00 until a low of $22.00 was reached in May. In June a sharp advance to $40.00 an ounce was brought about by reason of an agreement among the various producers to restrict supplies. This price was maintained for the balance of the year.

Iridium, despite the restricted importations, declined steadily from a high of $170.00 per ounce in January to $90.00 an ounce in December. Palladium was steady throughout the year at $20.00.

The Metal Consuming Industries

How the Different Branches of Our Industry Fared in 1931 and Their Outlook for 1932

The Brass Foundry

By

H. M. ST. JOHN

Associate Editor

FOR brass foundries 1931 has again been a year for the tightening of belts. The purchase of improved equipment, for plant modernization, was not so evident during the past year as it was in 1930, but many foundries, nevertheless, found it possible to reduce the cost of their castings as compared with more prosperous times. The bulk of the savings made probably consisted in the elimination of minor leaks and extravagances which crept in, gradually and unnoticed, during the years when foundries were hard pressed to meet their production requirements. At that time anything which increased productive capacity, even a little, was good business. Now, anything which decreases the net cost per cwt. of good castings, even a little, is a Godsend.

We believe it can truthfully be said that most of these savings have been made without greatly reducing the hourly rate paid to labor. However, the number of man hours required to produce 100 pounds of good castings has unquestionably been reduced, and, in this sense, the foundry industry, in common with many others, has perforce contributed to unemployment.

The Chicago meeting of the American Foundrymen's Association in May once more demonstrated the fact that foundrymen have become thoroughly sold to the idea that their business benefits by keeping constantly in touch with the progress of the industry and by exchanging vital information with competitors. The registration at the convention, the attendance at the technical meetings and the interest in the off-year, limited exhibition were all rather astonishing in view of the reduced-overhead policy so commonly in force in all branches of industry. The executives of the Association should be highly gratified at this evidence of faith in the value of their work.

Recent work on the gating of castings has been of particular interest to both brass and aluminum foundries. Renewed interest in this field was given an impetus by the results of the investigation sponsored by the A. F. A. at the Bureau of Standards. This work was reported at the May meeting of the Association, at which time there were also a number of non-ferrous papers which threw new light on this ancient subject. The Non-Ferrous Shop Operation course was likewise devoted to a discussion of gating problems for both copper and aluminum alloys.

Nothing very new or startling in the way of improved foundry equipment has been brought out during the year. The cupola as a brass-melting furnace has continued to attract interest and can fairly be said to have made a definite place for itself in the brass foundry. Centrifugal casting and, in general, the casting of brass into metal moulds is a subject of increasing importance. The commercial development of brass die castings, both in this country and abroad, has reached such a point that it can no longer be ignored, even by the most conservative. Every foundryman needs to consider very carefully to what degree moulding methods, other than the conventional use of sand, are likely to affect his business. The perfection of metal moulds and mechanical moulding methods is likely not only to replace sand moulding to a considerable extent but is also likely to bring back to the future foundry much business which has been lost to the automatic screw machine, the forge shop and the stamping plant. Since all metal must be melted and poured into some sort of mould before anything else can be done with it, it is obviously most economical to pour the molten metal into the ultimate product whenever this can be done in such a way as to obtain the desired physical properties and the specified finished dimensions without further work or machining. So far as we can see the attainment of this goal awaits only the development of suitable mould materials and casting methods.

During most of the year the price of copper and of other virgin metals has been so low that many foundries have almost discontinued the use of secondary metals in the form of alloyed ingot and purchased scrap. The present spread between virgin metals and secondary metals is not great and the cost of converting the latter into a usable form has become a serious factor. One result of this condition is that enormous stocks of metal scrap and wastes are being accumulated. These will tend to depress the price of secondary metals long after virgin metals reach more normal price levels, and the use of secondary metals should, for a time, become unusually profitable.

Considerable publicity has recently been given to a new series of alloys, containing copper, zinc and silicon, roughly in the proportions of 80, 15 and 5. These show some points of superiority over the tin bronzes and may ultimately be of substantial interest to the non-ferrous foundryman. Their varying compositions and characteristics are fully described in a series of articles by Dr. E. Vaders, which appeared in METAL INDUSTRY during 1931, pages 108, 155 and 196.

For some years the use of small percentages of nickel in brass foundry mixtures has been actively discussed. It seems now to be generally agreed that nickel improves the quality of brass and bronze, castings if used correctly and with discretion. A paper by N. B. Pilling and T. E. Kihlgren, given at the last meeting of the American Foundrymen's Association, summarized the known information on this subject and added substantially to the available experimental evidence.

The Non-Ferrous Rolling Mills

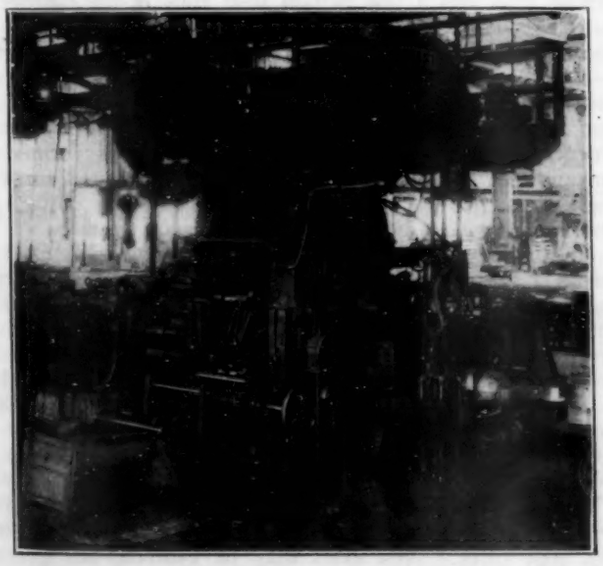
An Interview with a Leading American Rolling Mill Man

By WILLIAM J. PETTIS
Associate Editor

THIS industry has had other problems to meet in addition to the depression, such as that of meeting the competition of substitutes that have been used in the place of copper and brass. The stainless steels, aluminum, and its various alloys, zinc, "copper-loy" steels, etc. are really substitutes, as in no case do they have the combined merits of the artistic and practical values found in the copper, and copper-zinc alloys. But they have the advantage of first cost, and reasonable stability of price, and the brass mills must meet these conditions with other weapons than quality alone.

In reviewing briefly the developments in non-ferrous rolling during the past twelve months' period, we find not only the usual diligent and constant research that have led to forward steps in each year of this industry, but also something deeper,—a sweeping, historical change. It is affecting almost all the non-ferrous metals—brass, copper, bronze, nickel silver, aluminum and nickel alloys, zinc, various foils and many others, in many sizes and shapes. The precious metals are exceptions.

It is the transition from small orders and low output into high-production methods. The manufacturers of non-ferrous materials, because their combined output has seemed small by comparison with the annual consumption



Typical 4-High Mill Installation in Prominent Brass Mill.

of steel in its many forms, have been obliged to be cautious. Their orders, even at higher unit prices than corresponding steel products, have not aggregated enough annual business to permit a reckless outlay of capital. Their products, sold on merit and ultimate economy rather than on low first cost, necessitated patient sales effort and slow, constant education of the trade to appreciate their uses. The logical result was a deep-grained policy of caution at all times. In fact, a few disastrous experiences by intrepid pioneers at one time or another have only served to exaggerate, if anything, the conservatism which has come to be a byword in the industry.

But non-ferrous production is only low by comparison. Actually, the output of a great many of these mills today is as great as and even greater than that of steel plants of only a few years ago. A few producers are beginning to count their output in tons, although most of them still use the pound as the unit of measure. These are easily justified in using the larger unit. They have expanded their markets amazingly.

The interesting thing is that in such a year as 1931, with markets reduced and sometimes entirely disappearing, with prices at the worst point in history, and with new metals entering as competitors, the non-ferrous mills are nevertheless adopting high-production methods and economies. Without relaxing the metallurgical efforts which have always been the heart of their business, they are adopting the standards of American manufacture which always astonish the rest of the world.

The founders of the industry in the past generation or two would be dumbfounded at the money spent for equipment in non-ferrous rolling mills in the past few years. They would have found it difficult indeed to recognize the principle that expensive equipment, if it has enough production, can pay off not only its own interest and depreciation charges, but in addition to these can reduce the manufacturing cost, or conversely increase the profits. This is, in truth, a change. It is a credit to the leaders of the industry. It has the further advantage that, as markets improve and costs come down, it will stimulate new uses and outlets and will help the sales offices in their incessant labors to distribute the metal.

Although this article covers the rolling mill field only, the transition is not confined to rolling mills. It is affecting alike all such plant investments as furnaces, extrusion methods, wire drawing and tube drawing equipment, cranes and transportation devices, means of routing material, improvements in casting, pickling and annealing and many other phases.

Confining ourselves in this review to rolling mill equipment, the outstanding event in cold rolling history is the advent of the 4-high mill. First tried in Connecticut on narrow steel strips, this machine was never built in a large size until a manufacturer of copper strips tried it with success. The steel industry heard of it, and immediately took the process to its heart, installing 4-high mills everywhere on both hot and cold work, in which field they are now standard equipment for flat material.

The non-ferrous interests remained skeptical. A few of them made installations in which the machinery builders omitted to make the necessary alterations for non-ferrous work—an oft-repeated and sad experience of brass mill engineers in the past—resulting in still greater hesitation. In the Waterbury brass center today there is still a division of opinion because of one or two such installations. Several others in that district, on the other hand, have been highly successful. Fortunately, the overlooked alterations are now being corrected. In the rest of the country and in several foreign countries, new 4-high mills are continuing to supplant the older mills of 2-high type, and a number of installations have been made.

A similar mill, known as the Cluster Mill, employing

the same principles but with six rolls instead of four, has given some fine results in the rolling of nickel sheets and in one copper sheet mill. It has also been tried on brass strip work in a few places but is not being accepted generally because it costs as much as a 4-high mill, has more parts and rolls to keep in order and alignment, without enough advantages to offset these points. Its cost, in fact, is considerably higher than that of a 4-high mill of exactly equal capacity.

A variation of these mills is the Pull Mill, a 4-high stand with idle rolls, eliminating pinion stand and gear drive, with the power supplied by a heavy blocker or reel on each side, which pulls the metal strip through the rolls, reversing at the end of each strip. Although this invention has only been tried in one or two non-ferrous mills and has not been approved universally, its criticisms have arisen largely from overclaims in the beginning. Adapted from the manufacture of shim steel, it does excellent work on radiator brass and all similar products. The attitude of the industry has been that as the cost and the product are about the same as with a 4-high mill, and as the latter is more familiar to an experienced roller, the preference is for the simple 4-high design.

The principal applications of these mills have been in the finishing of strips and sheets. When used for running-down work, they must be of such size as to necessitate a large investment, to be considered carefully. But as every roller knows, the running-down operation is the field for big savings in rolling costs if the quantity of material is sufficient to justify the investment, and several of the largest producers of brass and copper have been installing them for this operation with great success.

None of these mills of new type have been applied to breaking-down work on non-ferrous metals to date. On steel products, they are widely used for much heavier duties than the heaviest existing non-ferrous work, and it is easily probable that the near future will see some large interest concentrating several of its mills into one plant where a single 4-high breaking-down mill will supply the entire production at a huge saving per ton of material rolled.

A development which must not be lightly regarded is the hot rolling of brass. Three companies are doing it commercially, in the breaking down stage, on certain mixtures. In several countries abroad this practice is well established, but the product lacks the qualities required by the American market. There has been a tradition for some years that brass can be hot rolled, but is so limited as to mixtures as to be relatively inconsequential. Care in jumping at conclusions has led these three pioneer mills to extend the hot rolling possibilities, not universally, but much beyond the scope thought possible. Several other interests are now considering it for brass and nickel silver.

In the hot rolling of copper slabs, the swing is away from the 3-high breaking-down mills which predominated, and towards 2-high reversing mills of increased size and strength, approaching the small 2-high reversing blooming mill of steel usage. For maximum efficiency it is the custom to handle both copper and brass on one such mill, which is large enough to take the combined output of both metals in the average plant.

Aluminum and nickel have adhered more closely to steel practice than any other non-ferrous metals. The former, in fact, is turned out in one plant from regular ingots of large size, rolled down in a blooming mill. Aluminum is following steel practice similarly when rolled into structural sections.

The manufacturers of rolled zinc have made few installations for high-production during 1931, having done this several years ago to meet the tremendous demands for the radio dry battery business, but losing that market with the invention of the all-electric receiving set, and now forced to seek new outlets for their product.

One new non-ferrous rolling mill plant for strips and sheets was built in 1931, for a new alloy never before marketed in those forms, which will be separately reported.

Tandem rolling of strips and sheets continues to appear in non-ferrous mills, but at a rate not nearly as rapid as would seem to be warranted by the result. The reason for caution in this respect will probably be found in some unsuccessful tandem rolling of brass slabs years ago, wherein the matter was held secret and the full benefit of steel experience was not received. Operators who have heard of this failure are probably loath to try what they regard as an experiment but what seems certain to become common practice in the end.

Hot rolling of rods is undergoing great changes. For some reason non-ferrous rod mills were not greatly improved up to the World War and for several years afterwards. The first continuous hot copper rod mill, introduced a year or two ago, and two looping mills of advanced design in 1931, have drawn attention to the advantages of new methods, and officials of almost every copper mill in the country are working on plans for entire new equipment to remedy a deficiency which they now recognize.

Roller bearings for the necks of mill rolls have not made as much progress in the non-ferrous field as in steel plants, but are coming in nevertheless. Several installations in 1931 saw them used in 4-high mills for heavy duty work and in 2-high mills for light, high-speed duties. In gear drives and ordinary shaft applications, they are gradually superseding plain bearings everywhere. They have not been widely approved for pinion stands already existing, but new pinion stands are largely roller-bearing equipped.

In rolls, which until recently have been almost entirely chilled iron and a few carbon steel rolls in the non-ferrous business, the year 1931 has seen the acceptance of various rolls of special nature to suit each class of work —cast alloy steel rolls for hot and cold breaking-down mills, several grades of chilled rolls for other operations, and in some cases the use of the grain (iron base) roll. Forged steel rolls for cold finishing of strips formerly encountered many difficulties in the sizes required for 4-high mills, but the makers have overcome the obstacles and 1931 has been gratifyingly free of such troubles.

In auxiliary and finishing machines, ingenious improvements continue to appear, accompanying the large primary units herein described. Turning from the past to the future in non-ferrous rolling, the outlook is conditionally bright. A large number of usable metals have been brought successfully out of the laboratory stage, each with its own peculiar properties and advantages. Stainless steel has just enough of the properties of non-ferrous material as to make it a serious competitor in many lines. Two major obligations rest on the non-ferrous producers.

They must ultimately, and preferably as soon as possible, cut down heavily the number of products and mixtures that they offer. New ones may be evolved, but great quantities of older ones should be scrapped forever. It is common practice in the whole industry to offer, literally, hundreds of mixtures, practically at the whim of each individual customer, and to accept small orders for each different one. This does not tend to economy of manufacture, nor to good operations or sales. Increased emphasis must be laid on those mixtures which, after careful study, are retained in the best interest of the industry.

As to manufacturing methods, those plants who adhere too closely to tradition must, in these days, have hard going. Those who look ahead and match the methods of the new metals now entering the field, adapting them to their own conditions, have nothing to fear.

Jewelry Making

By

C. M. HOKE, A.M.

Consulting Chemist, Jewelers' Technical Advice Company, New York

IT is natural that an industry of the luxury class should suffer during financial depressions. However, the financial seers and prophets come forth with one forecast that is most comforting to the jewelry world. It will be recalled that the boom days of 1928 and 1929 were not especially profitable ones for jewelers. With other luxuries selling actively, there was singularly little boom in jewelry. The reason was largely the unprecedented interest in the stock market, which absorbed millions of dollars that might have been expected to go into diamonds and pearls.

Now the seers and prophets are saying that the next boom—whenever it comes—will be a commodities boom. People will buy something they can wear, or use, or touch; something whose value promises to remain relatively stable. In other words, jewelry instead of stock certificates.

Diamond and Emerald Choker.

The carved emerald in the center shows the Victorian influence. It is surorunded by round and baguette diamonds, with two small triangular stones.

—Courtesy of Katz and Ogush, New York City.

Whether these be true words or not remains to be seen; but meanwhile the ancient and honorable jewelry industry is keeping up its courage and will be ready when the time comes.

The hardships of the last twenty-seven months have, to a noticeable degree, been eased by the sale of side lines; optical goods, radio sets, fine porcelains, music and musical instruments, and novelties of the gift shop type, have brought in many a welcome penny. It reminds us of the manner in which the drug stores, faced by a decline in the use of medicines, expanded themselves into restaurants, bookstores, and department stores.

Style Trends

At this time last year we were asking ourselves if yellow gold would come back. The answer has been an enthusiastic YES. It is here, alongside of red gold, pink gold, white gold, and platinum, the last mentioned having lost none of its popularity.

The Victorian influence is well established. Some feel that it has been overdone, and that the exaggerated massiveness of Victorian design which succeeded the lacy delicacy of the platinum era will give place to a happy medium—neither massiveness nor fragility. Probably the sentiment of the Victorian day will be with us for some time, but without the tonnage.

In diamond jewelry we see a continuation of the vogue of the baguette stone; this and other odd cuttings came in at the same time as the extreme Modernistic style, but should outlive the eccentricities of the latter, and become established in their own right.

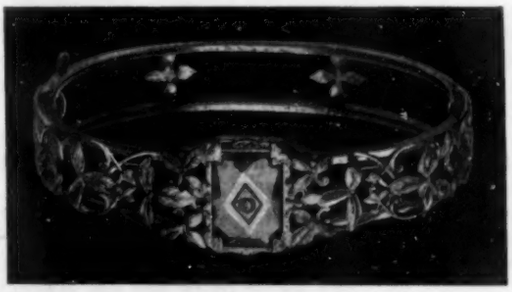
Last year we saw the effect on style of the Hindu motifs, a result of the London round-table conference on Indian affairs. This year we go still further back into the history of civilization, and become acutely barbarous. The French Colonial Exposition with its Algerians, Bedouins, and Congo tribes has had a profound influence upon novelty jewelry and the accessories of Milady's dress. The results have been most shocking to the sensibilities of our elder jewelers; great hoops of copper—yes, copper—are being sold for bracelets; pellets of copper alternating with lumps of ivory or teakwood are strung into necklaces; we see girdles of brass and copper snakes; and earrings of copper and carnelian are not only displayed but actually worn.

Diamond Dinner Ring.

This magnificent design shows several styles of cutting—the large marquise center, surrounded by baguettes, round stones, and at the side an unusual pentagon. The mounting is platinum.

—Courtesy of Katz and Ogush, New York City.

Nor is that the most striking instance of the cyclic return of fashions. It will be recalled that when aluminum was first prepared commercially by St. Claire Deville, about 75 years ago, it cost around $25 a pound, and one of the first things done with it was to make aluminum jewelry. Some of the original articles are now on view in our museums. So perhaps we should not be surprised at seeing, amid the copper hoops and the brass snakes, a few necklaces made of aluminum.



Gold Bracelet.

This graceful design expresses the sentiment of the Victorian age, but without massiveness or weight.

—Courtesy of J. H. Peckham and Sons, North Attleboro, Mass.

We are all free to make prophecies regarding future style developments, and amid such variety almost anything seems possible. One forecaster sees a revival of

religious designs—a fleeing from the geometric Modernistic, and a revulsion against the sophistication of the day.

Technical Notes

Encouraged by the continued vogue for white metals, and spurred by the gathering dissatisfaction with chromium plate as a jewelry finish, our technical men have turned to the platinum-group metals for use in finishing. Methods for electro-depositing platinum, palladium, and rhodium have been worked out and put into commercial operation. These bid fair to become of real value to the industry.

Market Conditions

The monetary crises of the day—England's abandonment of the gold standard, the precarious position of the silver market, and so on—will be discussed elsewhere. There is no evidence that these crises, momentous as they are, have any effect upon jewelry design.

As regards platinum, we learned last October of the formation of a new English company, Consolidated Platinums, Ltd., whose influence on the platinum market may be important. It has concluded contracts to handle a large proportion of the platinum production of the world, including the output from Soviet Russia, South Africa, South America, and Canada.

The announcement of this company states that one of its major functions will be to promote the more general use of platinum through scientific research and the development of new markets.

It is assumed that the formation of an organization of this kind will have a stabilizing effect upon the price of platinum, which should tend to encourage its use in jewelry. In this connection the suggestion that platinum again be used as money is of real interest, however far we may be from seeing the thought put into practice.

Secondary Metals

By

THOMAS A. WRIGHT

Technical Director, Lucius Pitkin, Inc. Chemists and Metallurgists,

New York

DURING the year, the term used as the title of this review has been the subject of considerable interest and discussion centering around Copper in the main, it is true, but pertaining to all metals. At the A. S. T. M. Convention held in June at Chicago, a B-2 Sub-Committee on Nomenclature was assigned the task of defining Secondary Metals and a report is also to be made that, it is hoped, will clarify the use of two other classifications that overlap one another, viz.: Ferrous and Non-ferrous.

The continued reduction in values has been simultaneous with as great a reduction in tonnage although there have been exceptions as always in certain metals. The economics of scrap metal as a result have been studied more earnestly by those cognizant of the importance of the subject and brought forcibly to the attention of others who previously were not aware of or had not appreciated their significance. So notwithstanding the continued slump in business, we have had real progress along a very vital line.

This cannot be claimed for the technology as far as anything of an outstanding nature is concerned. Greater attention is being paid, of course, to salvage, reclamation, and utilization of the metals, and more is being done, much more, along the lines of prevention. In other words, the chemist, metallurgist and engineer is coming more to the fore in this field and less is being left to the purchasing agent and accountant. Which is as it should be. Each has his part to play.

A real contribution along these lines was made by C. H. McKnight, Supervisor of Inventory Control for the General Electric Company in a paper entitled "Segregation and Control of Waste" presented in April at the National Management Congress, and held under the auspices of the Elimination of Waste Committee of the A. S. M. E. at Cleveland. Other papers were presented on briquetting and handling of iron and steel scrap that had food for thought for users of non-ferrous and precious metals.

The general Fall meeting of the National Association of Waste Material Dealers was omitted this year, but the March meeting in Chicago had some very helpful discussion particularly in Copper, Lead and Aluminum classifications and contamination of scrap.

The Salvage Division of the National Association of Waste Material Dealers, however, held a very interesting two-day session in Schenectady attended by representatives of a number of large producers of scrap metal. Segregation, control, elimination, sampling and analytical phases of Secondary Metals were brought out by the reviewer in a paper "Random Thoughts of a Consulting Chemist on Salvage." As a result of the discussion, a proposal was made to form a committee to draw up standard methods of Sampling. A man-size and lengthy job, but badly needed in some respects. The interesting feature of the proposal, however, is that it was instigated by a non-technical member of long experience.

As always, papers of interest to the secondary field were presented at the Convention of the American Foundrymen's Association; and, at the American Society of Testing Materials, the use of the spectrograph was emphasized as an aid in utilizing scrap metal. This is a development that will bear close study. It is being applied both at home and abroad not only for the more accurate identification of alloys and the presence or absence of impurities present from the ore or introduced through the use of the wrong scrap metals, but also in the rapid quantitative estimation of certain of the low percentage constituents.

The spectrograph is peculiarly an instrument for the user of Secondary Metals, so much so that the number of installations in the metal industry is proceeding apparently as fast as the makers can supply them. This year

has seen the setting up and daily use of a Bausch & Lomb spectrograph in the laboratories of the company with which the writer is associated, which so far as is known is one of the first applications to be made by an independent consultant or commercial laboratory. The scrap metal trade, which having been educated to consider percentages as well as color or "heft," learned, therefore, though tardily to appreciate differences of 1 to 2 percent, is now asked to look forward to hundredths of a percent! The continued infiltration of secondary metal into smelter and refineries is introducing a new type of impurities, for the refinery metallurgist to worry about.

The process of education and stark necessity are rapidly destroying the prejudice against primary metal made in part from secondary and less is heard of the need for using "Virgin" metal. Indeed the use of the term is less and less justified for an appreciable percentage of the output of some of the metals. An interesting sidelight on this was a proposal put before the A. S. T. M. to cease designating refined copper as "electrolytic" and "fire refined" on the grounds that it is not the origin of the material nor the "refining process" which is of interest to the consumer, metallurgist or engineer so much as it is the chemical composition, and the physical or electrical characteristics. An argument hard to combat.

The Non-Ferrous Metal Institute has continued its investigations through the fellowship established at the Bureau of Standards. The work so far has given valuable information on the physical properties of 85-5-5-5 alloy. Both primary and secondary or remelt metal is being used and fluidity is being especially studied. Bregman in a paper presented before the Institute of Metals in 1922 on "Foundry Difficulties" showed conclusive indications of the need for study along those lines.

The American Foundrymen's Association has brought out three Recommended Practices covering the previously mentioned alloy, 80-10-10 and Manganese Bronze, and the American Society for Testing Materials in co-operation with the Non-Ferrous Metals Institute has a new ingot metal specification B-30-317 which has been changed in several important instances and covers twenty instead of fifteen alloys as previous. A Committee of the Metals Division of the National Association of Waste Material Dealers, together with the editor of THE METAL INDUSTRY and other trade papers, and other interested persons, has issued a questionnaire during the year on the Nomenclature of Scrap Metals with the desire to bring about greater uniformity in the terminology used in the trade. This report should be of real benefit.

Old alloys continue to be employed in new uses on the one hand, and restricted on the other, by the continued investigations into the properties of metals. Special Alloys are being produced to replace or substitute for older more familiar ones. Impurities referred to previously, are the subject of greater and more intense study than ever before. So too are Gases in Metals. Calcium, Lithium, Boron and Phosphorus are being pushed to the fore as deoxidizers. Bismuth and Beryllium are being watched with interest as carefully planned research searches for outlets and uses. All will come back in greater or lesser extent as Secondary Metal.

Their presence with the major or name constituent may be helpful, harmful or of little moment to the refiner, smelter, ingot-maker or foundry men. They cannot be ignored—their efforts will bear study by the trade.

Improvements in the joining of metals such as nickel on steel, stainless steel on low-carbon, gold alloys on pure nickel (rather than on nickel-silver) and on steel, and the extension of the Shoop process will bring back more unusual combinations as scrap. So, too, has the extended use of cutting tools such as Carboloy which permits a simultaneous operation on such varying materials as cast-iron, brass and bakelite or rubber assembled as one article. Other instances are selenium in rubber insulation, lead in asbestos insulation, zinc in lacquer. Copper wire thus coated is reduced in grade, its use limited.

Chromium plated articles are now also starting to come back as scrap, but are not yet of real importance. Silver soldered scrap is.

Stainless steel and nickel steel have given more trouble than ever to the user of nickel scrap as an addition metal, a practice which has extended rapidly. The need for metallurgical aid to the dealer may be brought out vividly by an example:

Radio scrap, of course, as often sold consists of a mixture of nickel, molybdenum and copper wire, but a very large accumulation of Nickel Scrap amounting to many tons had in addition considerable Monel and nichrome wire. The dealer went to the considerable expense of having this cast in pigs which weighed several hundred pounds each and when last heard of were begging for a buyer—at least at a price commensurate with the nickel, copper, chromium value. If proper consideration had been given from the metallurgical and the economic standpoint, this should have had a ready market in the new and important nickel-chromium-copper cast iron. On present individual foundry tonnage, the mixture can hardly be used in "pig" form except to a very limited extent and at a financial sacrifice.

Chromium has come out in an aluminum alloy. Magnesium base alloys have grown in favor during the year. A 16 lb. crank case and oil cooler has just recently been made as an aluminum die casting. More complexity for all concerned!

In the common metals, copper has been especially prominent. A paper by Percy Barbour on "The Effects of Secondary Copper on the Metal Market" presented at the Fall meeting of the Institute of Metals brought out a large attendance and a spirited, but very enlightening, series of discussions as well as editorial and other comment. Of special value was the series of tables presented by Mr. Barbour and by Mr. Ludwig Vogelstein. The latter shows a Total Secondary Production including the Copper which remained in alloys of 4,685,220 tons for the years 1920-1930 inclusive against Exports (excluding manufactures, ores, concentrates, black copper and composition metal) for the same period of 4,450,792 tons. Rather interesting in view of the agitation for a tariff on copper.

Statistics covering exports of Secondary Copper for the year are, of course, not available, but high-grade scrap copper shipments such as heavy, No. 1 and No. 2 wire appear to have increased considerably while brass scrap has decreased.

The Department of Commerce has carried through a survey of the Secondary Copper industry which will possibly be reported shortly after the first of the year. It is probable that being the first year that such a project has been undertaken that there must be a number of gaps unfilled, if past history is any criterion, but, nevertheless, if all the trade has co-operated, the results should be very helpful.

Refinery, smelter, ingot and foundry consumption has decreased greatly, but so has production. Accumulation is going on as the year closes.

Especially noticeable has been the drop in the replacement of lead covered power cable and telephone cable, although probably not quite as marked in the latter. Mention might be made here of the acquisition of the Nassau Smelting & Refining Company by The Western Electric Company the first entry of a large consumer of metals

into the smelting and refining field, although it is true that several instances are known of large producers refining or processing part of their own non-ferrous accumulations with varied success.

Another of the large Eastern copper refiners has actively entered the market for secondary copper and lead and one of the largest Western lead producers, early in the year, became actively interested in the purchase and smelting of battery lead for an Eastern plant. The latter commodity has been a rapid mover from the Atlantic Seaboard to Chicago. Always a source of discussion, because of grading and moisture, it appears that at last "hit and miss" methods of buying may be superseded by those that will permit of closer control of actual smelting losses and recoveries. A new development has been the greater use of motor deliveries and consequent aggravation of the moisture question. For obvious reasons, such shipments average about 2% higher than carloads. Tonnage in general has kept up well, but there has been very little accumulation.

Lead, tin, terne and solder drosses have fallen off considerably as have zinc secondaries.

Aluminum continues to find new applications, one of which has been referred to, and aluminum die casting and zinc die casting are replacing brass, both cast and wrought, and also sheet-iron. Aluminum-bronze is looking up. Copper-aluminum alloys, however, continue to be a negligible scrap item at copper refineries.

The Aluminum Research Institute has continued its investigation of Methods of Analyses especially applicable to aluminum alloys, remelt, intermediate and those of especial interest from the secondary metal standpoint. A Committee composed of several chief-chemists together with the consulting chemists retained by the Institute have as a result drawn up Tentative Methods for 98/99, No. 12 and similar alloys and are working on those for silicon, nickel and similar intermediates or hardeners. These methods will likely be released early in 1932 for public trial.

It is hoped, at the same time, to suggest methods for sampling which will remedy much of the troubles often erroneously blamed on analysis through lack of appreciation of segregation and unhomogeneousness inherent in some alloys and many types of castings.

This investigation which has included the careful preparation of certain standard samples has been one of the real contributions of 1931 to progress in secondaries.

Summed up, there has been little along the lines of progress in 1931, that is new and less that is profitable—monetarily that is. Dr. Paul Merica in addressing a regional meeting of the A. S. T. M. held last Spring in New York on the subject of "Alloy Building Opens Up a Wider Field to Non-Ferrous Metals" lists 175 alloys commercially used. As these drift back as scrap metals in increasing tonnage, it appears that there are many problems left or coming to engage the minds of chemists, metallurgists, engineers, economists and accountants. A complex subject such as Secondary Metals which in the year 1929 amounted to over 300 millions of dollars has passed far beyond the stage where ability to buy and sell are the only requisites. Yet some technical men still think of it as the "junk" business. However, 1931 has been a year of education in more ways than one—there are not as many such as there were.

Contributions of 1931 in the Field of Electroplating

By DR. A. K. GRAHAM

Associate Editor

WHAT can one say about the developments in the field of electro-deposition with the year just past? Certainly the cooperation of the American Electroplaters Society and the American Society for Testing materials in the activities of Committee A5 of the latter Society, ultimately resulting from the challenge of the stainless alloys and hot galvanizing processes, is the most significant accomplishment. It marks a decided advancement of the American Electroplaters Society in the eyes of the scientific world to have attained this recognition.

Of the activities of Committee A5, the field tests on metallic coatings are of most importance to the electroplating industry. It is too early to say anything about the results of these tests, but it is hoped that they will yield information relative to the protective value of various coatings under different climatic conditions that has long been wanted.

Furthermore, generous financial support of this undertaking is not asking too much of the industry that will be directly benefited and the fate of which, in some respects, may rest upon the results.

The use of thickness of chromium (0.00002-4 inch) giving the minimum porosity, obtained under conditions of higher temperatures, current densities and, sometimes, higher bath concentrations, has improved greatly the character of the composite coatings of which chromium is a part. For heavier deposits of chromium alone, the altered conditions have resulted in less porosity and improved throwing power. Current densities from 300 to 1,000 amperes per square foot have been used in certain cases, usually requiring from six to twelve volts.

The Aluminum Research Laboratory has developed a procedure for obtaining thin layers of chromium directly upon aluminum which have fairly good resistance to salt spray and atmospheric corrosion. Such deposits have a gray color on leaving the bath and must be buffed if a lustre is required. These deposits protect aluminum to a marked degree from alkaline corrosion. Heavy deposits for abrasion resistance have also been applied directly to certain aluminum alloys.

Before leaving the subject of chromium plating it should be mentioned that the patent situation is still unsettled in

view of the fact that the recent decision upholding the patents has been appealed.

The General Motors Research Laboratories report that 60,000 gallons of low pH nickel solutions are operated within their own company and it is estimated that at least an equal volume of this solution is being used outside. Their more recent studies show that a bath of high concentration [400 gm/1 (53 oz./gal.) of single nickel salts] operated above 90° F. and at a pH of 5 will give quite satisfactory thick deposits of nickel at high current densities. The limiting current density is greater for the more concentrated bath. It was also found that the hardness of the depost varied with the temperature, but not to any extent with the pH.

Two valuable papers on silver plating were presented at the convention of the American Electroplaters Society —A most practical resume of silver plating by Frank Mesle, and a very exhaustive study of the effects of all the plating variables on the operation of a silver cyanide solution by Dr. B. Egeberd and M. Promisel. In the latter paper, among other things, the relative value of sodium vs. potassium salts is decided in favor of potassium salts.

Vapor degreasing of manufactured parts has come to the fore. While the organic solvents are relatively expensive, there is every reason to believe that this method of degreasing will become more extensively used in applications where the economics involved will justify it.

Throughout the industry more attention is being paid to the character of the base metal. This emphasis is not misplaced. The greater part of most plating cycles is devoted to preparation of the metal prior to plating and this can often be simplified by a more careful selection of base metal. In the case of cold rolled steel, so much difficulty has been experienced that some manufacturers are now ordering steel of a different character for plating than that used for enameling or other finishes. In this connection it may well be stated as an accomplishment of the past year, that at least one paper delivered before the American Electroplaters Society attempted to present this problem to the industry for its serious consideration.

In the field of the more noble metals, the plating of rhodium and palladium have become commercially successful. The plating of tungsten, while not a noble metal, may be mentioned here as an accomplished fact. Its commercialization may not be far distant.

In conclusion, one may fairly say that the developments of the year 1931 have not equalled the years immediately preceding. It would be interesting to know whether this marks the beginning of a decline in activity in the development of plating or just a reflection of the present economic conditions. It must be admitted that there is not the opportunity for development of equipment and plating processes today that existed prior to the scientific awakening that started a little more than a decade ago. While the demand for plating will undoubtedly continue and its further application is expected, the rate at which the art will be developed in the future may be expected to decline somewhat.

Problems in Electroplating

By OLIVER J. SIZELOVE

Oxidizing Copper

Q.—I have a formula for oxidizing copper. This formula, while producing excellent results, is not recommended for general use, as it requires careful handling. It is as follows:

"Dissolve 10 parts copper in 25 parts by weight of strong nitric acid and then add 150 parts of 20% acetic acid and five parts of ammonium chloride. The resulting solution shall be diluted with about 3 parts water and applied to surface with a brush and allowed to dry. Sufficient applications at one or two day intervals shall be made until desired effect is produced."

This formula is being used on copper metal coloring on outside and inside of buildings. Sometimes the height of copper facing is over 25 stories.

Have you a formula that is easier to apply and that would not require such particular and careful handling?

A.—If the solution prepared from the method given produces satisfactory results, the method of preparing the solution may be simplified by substituting 3 pounds of copper nitrate in place of the nitric acid and copper used. This will eliminate the operation of dissolving the copper in the nitric acid and the poisonous nitrous oxide gas that is given off in the chemical reaction. The formula would then become copper nitrate, 3 pounds, ammonium chloride, 1 pound, acetic acid, 1 gallon, water 3 gallons.

Dissolve the copper nitrate and the ammonium chloride in the water and then add the acetic acid. While the brushing or dipping methods is usually used in applying the solution, would suggest the use of a spray gun for your particular requirements. A spray gun of the type that is used for applying paints or enamels should be used.

Bronze on Aluminum

Q.—In checking through your Platers Guide Book I do not find any formula to plate a bronze color on aluminum. Will you please advise us if you have such a formula and if not do you have a copper formula that will plate aluminum castings.

A.—Either of the formulae for bronze or copper plating can be used to plate aluminum with a bronze or copper color providing the aluminum is properly nickel plated.

To nickel plate aluminum successfully a special dip is necessary and the composition of this dip will depend upon the alloy of aluminum to be plated.

In a paper read at the Fifty-third General Meeting of the American Electrochemical Society at Bridgeport, Conn., April, 1928, by Dr. Harold K. Work, the method of nickel plating on aluminum and its alloys are fully described. See THE METAL INDUSTRY for June, 1928, page 261-263; July, 1928, page 313-315.

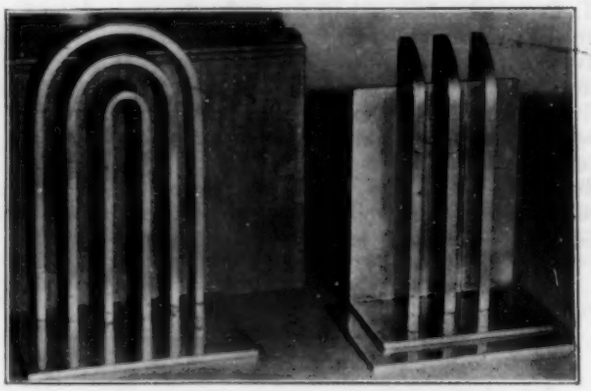
Fine Examples of Modern Metal Work Displayed at the Industrial Art Exhibition

THE Twelfth Exhibition of Contemporary American Industrial Art was held in October and November at the Metropolitan Museum of Art, New York. The display of products included some very fine examples of metal working and finishing, a few of which are here illustrated.

The exhibition was characterized this year by a notable and gratifying absence of extreme designs of the modernistic type, whereas there were some very excellent exhibits showing that the design of industrial products has nevertheless gained considerably from the modernistic tendencies of the past few years.

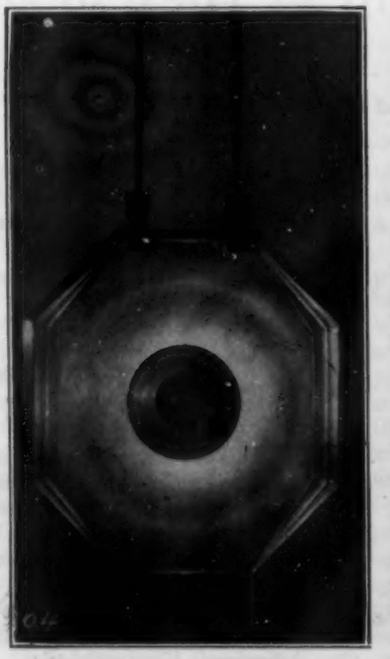
Besides the exhibits of the companies mentioned in connection with the accompanying illustrations, there were good groups from the following companies or from individuals with whom these companies co-operated: Aluminum Company of America, P. & F. Corbin, Early American Pewter Company, Paul T. Frankl, General Bronze Corporation, New York Art Iron Works, Towle Manufacturing Company.

The illustrations herewith are reproduced by courtesy of the firms mentioned in connection with them, who hold all rights to the various designs.



Modern Bookends, Designed by Walter Von Nessen for Chase Brass and Copper Company, Inc., Specialty Sales Department, New York. Black and Satin Nickel Finish.

A Teaspoon of the American Directoire Style in Sterling Silver by Rogers, Lunt and Bowlen Company, Greenfield, Mass.



Photo, Kantack

At Left—Lighting Fixture by Kantack and Company, New York City. At Right—Hand-Wrought Grille Designed and Manufactured by Edward F. Caldwell and Company, Inc., New York City.

A Teaspoon of the Elsinore Style in Sterling Silver, by International Silver Company, Sterling Silver Division, Wallingford, Conn.

METAL INDUSTRY

With Which Are Incorporated
COPPER AND BRASS
BRASS FOUNDER AND FINISHER
ALUMINUM WORLD
ELECTRO-PLATERS' REVIEW

Address all correspondence to Metal Industry, 116 John St., New York. Telephone, BEekman 3-0404. Cable Address Metalustry.

PALMER H. LANGDON...Editor and Publisher
ADOLPH BREGMAN.....Managing Editor
THOMAS A. TRUMBOUR.....Business Manager
EVAN J. ROBINSON.....Advertising Manager

Member of Audit Bureau of Circulations and The Associated Business Papers

Published Monthly—Copyright 1932 by The Metal Industry Publishing Company, Incorporated. Entered February 10, 1903, at New York, N. Y., as second class matter under Act of Congress, March 3, 1879.

SUBSCRIPTION PRICE, $2.00 Per Year. SINGLE COPIES, 20 CENTS. Please remit by check or money order; Cash should be Registered. Advertising Rates on Application. Forms Close the First of the Month.

EDITORIALS

Review of 1931 . Hopes for 1932

NON-FERROUS metal industries in 1931 remained under the influence of the economic depression which grew deeper and broader throughout the year. It seemed, in the early Spring, as if we were about to rise, but the improvement was short-lived. According to Secretary of Commerce Lamont the renewed slump was caused by a series of financial crises abroad which culminated in the suspension of gold payments by several nations. Others, not of the same mind, claim that we had not yet been thoroughly deflated and that the evil elements in our own system had not yet been eliminated.

Be the reasons what they may, the facts are that industrial production declined about 16 per cent from 1930 after an 18 per cent decline from 1929. Freight car loadings went down 18 per cent. Construction (total contracts awarded)declined 30 per cent. Residential building dropped 25 per cent and public works and utility construction were off 28 per cent. Exports declined between 18 and 20 per cent and imports about 10 per cent.

Security markets reflected the general tone of business. The bond list was particularly weak which made it difficult to float new issues. Bank suspensions, particularly among the smaller banks, were numerous. They involved only a small percentage of the total deposits but the effect in many local communities was extremely serious. Recent statistics indicate an unemployment total of about 5 per cent of our population, or over 6,000,000 in all.

In order to stem the adverse tide, President Hoover proposed and obtained by agreement with the other nations involved, a year's postponement of inter-governmental debt payments, in order to ease the stringency abroad. At the same time the Federal government increased sharply the amount of public construction to be undertaken, having more than doubled the usual number employed.

All of these efforts were of course general. But the non-ferrous industries, being almost entirely secondary in character and depending upon other industries for their prosperity, follow closely the swings in general business. Railroads, automobile manufacturing, shipbuilding, general construction, housing and electrical manufactures all declined and their decline was followed by a decrease in orders for metals, metal products and metal finishes.

The best that can be said for the year 1931 is that it is now past.

METAL PRICES

Probably the greatest sufferers in a declining market are the raw materials because they are the first to suffer decreases in the prices for their output and the last to be able to demand lower prices for their purchases. This was the situation in which metals found themselves in 1931. Copper began the year between 10 and 11 cents a pound and has ended it under 7½ cents. Prime Western zinc opened the year at 4⅛ cents and closed it at 3⅛ cents. Tin opened at 26⅝ cents and closed under 22. Lead started at about 5 cents and ended at 3.75. Antimony began at about 7½ cents and finished at a little over 6.

The only exceptions to the rule were nickel and aluminum which were held in control by their producers, their prices remaining unchanged.

The precious metals, platinum and silver, had their usual ups and downs, but ended in both cases at about the same levels as they began; platinum at $37.50 per ounce and silver, about 30 cents.

The causes of these price trends are by this time known to everyone. Almost without exception more metals were produced than could be consumed. Stocks rose and consequently prices declined. Only when stocks are clearly on the way to being consumed and when consumption and production are in line with each other will prices rise again. We commend this altogether unoriginal and simple solution to those who should be interested in good prices for metals, but who for a variety of reasons, have found it impossible to put into effect the simple first principle of business—not to manufacture a product for which there is no market.

TECHNICAL PROGRESS

For a year of deep depression, the metallurgical and mechanical progress in non-ferrous metals was remark-

able. There was no relaxation of effort to develop new products or to push old ones into new lines.

In copper base alloys the silicon mixtures continued to attract increasing attention and to show great promise. The American Society for Testing Materials, together with the Non-Ferrous Ingot Metal Institute, pushed ahead its good work of standardization by listing 20 alloys for copper base ingots for castings, which should amply serve the purposes of the hundreds of mixtures formerly demanded of the trade. Centrifugal casting held its ground and added to its uses. Permanent molds for brass castings drew more than usual interest, and the long sought for brass die castings finally appeared. The tendency seems to be strongly in the direction of casting in some form of permanent mold and getting away from sand.

Aluminum continued its regular course of methodical expansion. A new alloy containing 1% magnesium, 1% manganese, balance aluminum, was found to be readily formable and to resist permanent deformation. Its properties can be produced by cold work; (it is not heat-treatable). Aluminum foil was found effective as an insulator.

The outstanding feature in brass fabrication was the introduction and spread of the 4-high mill. Another important development was the improvement in hot rolling brass. The technique of welding nickel was greatly improved with the resultant broadening of the use of pure nickel products.

In the electrical field as applied to metals, the coreless high-frequency induction furnace was developed in larger sizes. An interesting electrical copper brazing process was worked out for joining steel parts.

In the laboratory the spectrograph has assumed greater importance as a delicate aid in the analysis of metals and alloys. It is now being used even on scrap and secondary material.

Electroplating has a number of new developments to its credit. Rhodium plating has spread more widely and with it have come increased interest in the plating of palladium, platinum and tungsten. A method of plating chromium directly on aluminum has been worked out. A new process of electro-tin plating has been developed. Nickel plating under low pH is being extended. Another new process which should attract more attention, as its principles become better known, is the degreasing of metals by means of vapor.

A commendable trend in manufacturing is the increased attention being paid to base metals before electroplating. A great many of the ills formerly blamed upon the electroplating department will be cured if the base metal is supplied in proper condition.

Fancy finishes for aluminum by means of anodic oxidation and the subsequent dyeing of these coatings in a wide variety of colors and shades, is growing steadily.

Probably the outstanding step of the plating industry was the undertaking of a research by the Research Committee of the American Electroplaters' Society and the American Society for Testing Metals, into the possibilities of standardizing metal coatings. This is the first time the industry as a whole has moved the direction of standardization, which it has long needed. A project of this kind is large, but regardless of the time it takes, its successful completion is indispensable to the building of a firm foundation for electroplating as a science and an industry.

ECONOMIC DEVELOPMENTS

In a year such as the past has been, with all minds focussed on the all-absorbing problem of effecting improvement in business, there are inevitably many plans suggested and even tried.

The copper producing industry, which seemed to be thoroughly fortified a few years ago, but which lost control completely, of its market, came to an understanding for the curtailment of output. At the same time there is agitation among the mining companies in the United States for a tariff to protect American copper. How successful this agitation will be depends entirely upon the progress of the copper market and the willingness of the factors in the industry to co-operate, both nationally and internationally.

In the other metals the effort has been along the lines of spreading their spheres of activity rather than in regulating competition. Lead seems to have made an interesting impression on the building industries for decorative effects, both as pure lead and as lead coated copper. Zinc seems to be very definitely on the road to increasing the consumption in its largest market, galvanizing, through the use of heavier coatings as urged by the American Zinc Institute. Tin has made an innovation in the hot coating of cast iron automobile pistons to compete with the aluminum pistons now so widely in use. Nickel has a promising outlook in nickel-clad steel. Both pure nickel and Monel are being used more widely in dry cleaning equipment, the rayon industry, the marine field and in building construction. Of course, building is the one great Promised Land for all metals, and it seems that they will all benefit. Copper, zinc, nickel, aluminum, lead and chromium plating are entrenching themselves and there is now more and more talk of all-metal buildings. The new alloy of aluminum (1% manganese, 1% magnesium), is also useful in building construction having been employed in the pilaster sections of the new Municipal Stadium in Cleveland. It is also being included in railway cars, buses and a wide variety of fabricated articles.

The low price of silver has stimulated Sterling silver sales greatly, but this outlet is such a small part of the output of silver as a whole that there has been pressure from some of the producers for other more important measures to improve prices. Among these is the monetization of the metal with or without definite ratio. It is interesting to note, however, that the largest American trader in silver is definitely against such a move, pointing out with considerable force that the total decline in the value of silver for any given year throughout the world is such a small proportion of the world's trade that it could not possibly be a very important factor in the present world wide depression. It is of course, the cause of severe local suffering among the silver producing countries and in the silver manufacturing industries where inventories play a large part, but silver alone cannot be considered the lever by which the world's business can be lifted out of the rut.

Platinum prices seem to be on the way toward stabilization through an international combine.

The outstanding economic event of the year in the electroplating field was the decision in the chromium plating patent case whereby the Fink patent was upheld and United Chromium, Inc., awarded damages in a test case. The decision was appealed, however, and the matter is still in litigation.

Strong interest is being evinced in powdered metals. The market for the various finishes obtainable seems to be extremely broad, the only obstacle being the difficulty of powdering some of the more refractory materials. We look for important developments along these lines within a comparatively short period.

THE OUTLOOK FOR 1932

After the past two years, only the more foolhardy will dare to prophesy where the great have come to grief. The annual review issues of the newspapers were conspicuous this year for the absence of forecasts. Even the members of the administration in Washington, who are almost compelled by their position to tell us what they think is coming, are extremely careful to avoid specific promises.

The business progress in the United States seems to be interlocked with the condition of Europe. We hope that the soft spots abroad can be stiffened so that we will receive no further shocks from that direction.

To strengthen us internally the National Credit Corporation has been established to keep banks from going under unnecessarily. A Reconstruction Finance Corporation will probably be organized shortly to lend the aid of government credit to deserving industries to tide them over to better times. A central mortgage bank is in project which it is hoped will release funds for additional home building, a field now badly cramped by the widespread effects of unemployment and bank failures. When the railroads come through their really severe trials they will again be heavy buyers of materials, although it is doubtful if they will reach that happy stage within the next year. The electrical industries, according to Gerard Swope, president of the General Electric Company, look forward to 1932 as at least as good as 1931, after which an increase can be expected. It is a modest hope to be sure, but if it comes true, at least the downward trend will be ended. Building in 1931 is said to have totalled about $2,900,000,000, not counting public works and utilities. It is estimated by the Copper and Brass Research Association that in 1932 about $3,400,000,000 will be spent for the same purpose. We hope that they are right. The automobile industry very obviously avoids estimates this year; for two successive years they have shot very wide of the mark. There is a feeling, however, that this industry will be among the first to recover because of the heavy depreciation and the consequent need for replacement which is characteristic of automobiles. The manufacturing jewelry and silverware trades will be better or worse as business and employment are better or worse. This is one of the few branches of the metal industries which deal directly with the consuming public, but it is to a large extent a luxury industry, and depends more than most others, upon good times.

In the midst of depressing surroundings and lowered financial resources on all sides, we do, however, see interesting exceptions, which prove that ability may overcome even the most serious obstacles. There is a great deal of justification in the attitude that our hope lies not so much in government action as in the strong and controlled operation of our individual businesses. Robert H. Stanley, president of the International Nickel Company phrased it very well when he said "The industrial world has finally learned during the year 1931 that prosperity cannot be conjured back by pronouncement. We have been taught that salvation lies in increased plant efficiency, in greater marketing ability and in a better understanding that certain situations transcend the capacity of single companies and become problems with which industries as a whole must cope. The further lesson has been given us that the maintenance of prosperity depends on severe discipline in good times."

We face 1932 then, in the attitude of hope. We no longer delude ourselves with false, rosy-hued predictions. We have no illusions about our past mistakes. But this is all behind us. While floundering in the morass of the worst depression in decades, we have continued to strengthen and fortify the solid foundation of our business. We have carried on and extended research. We have developed new lines of products and new outlets for old ones. We have learned closer control of plant operations and expenditures. We face 1932 with an attitude of hope.

Necrology

Among the men of prominence who passed away during 1931 were the following:

W. G. Harris, president Canada Foils, Ltd., Toronto, Can.

Carlton B. Coe, general manager, Steele and Johnson Manufacturing Company, Waterbury, Conn.

Howard Evans, vice-president, J. W. Paxson Company, Philadelphia, Pa.

Sir Charles A. Parsons, London, England, inventor of Parson's manganese bronze.

James A. Morrison, president, James Morrison Brass Manufacturing Company, Ltd., Toronto, Can.

Alfred B. Botfield, president, Botfield Refractories Company, Philadelphia, Pa.

James G. Patten, president, Metals Protection Corporation, Indianapolis, Ind.

William H. Leiman, president, Leiman Brothers, New York.

Philip O. Schleussner, vice-president, Roessler and Hasslacher Chemical Company, New York.

Harwood Byrnes, vice-president, Aluminum Company of America, Pittsburgh, Pa.

Stewart A. Trench, vice-president, C. S. Trench Company, metal brokers, New York.

Samuel J. Weil, formerly president of the United Smelting and Aluminum Company, New Haven, Conn.

William A. Cook, Matthieson and Hegeler Zinc Company, New York.

Harry L. Benedict, president, Benedict Manufacturing Company, East Syracuse, N. Y.

J. Howard Miller, superintendent of the rolling mills and extruded rod mill, Scovill Manufacturing Company, Waterbury, Conn.

Harry J. Cushman, president, Ferro-Enamel Corporation, Cleveland, Ohio.

Dr. W. L. Kingsley, former president of the Rome Manufacturing Company, Rome, N. Y.

Dr. E. G. Acheson, chairman of the board of directors, Acheson Graphite Corporation, New York.

John L. Agnew, vice-president, International Nickel Company, New York.

Charles M. Robertson, president, James Robertson Company, Ltd., Montreal, Can.

F. J. Glennon, vice-president, Aluminum Industries, Inc., Cincinnati, Ohio.

Samuel J. Wells, president, A. H. Wells Company, Waterbury, Conn.

W. B. Folsom, president, Exeter Brass Works, Exeter, N. H.

Robert Crawford, Atlas Foundry Company, Detroit, Mich.

Robert Wise, president, Buckeye Products Company, Cincinnati, Ohio.

Frederick S. Jordan, sales manager, International Nickel Company, New York.

H. C. Larter, president, Larter & Sons, New York.

Correspondence and Discussion

Independent Chromium Platers' Association

Editor, THE METAL INDUSTRY:

The recent decision by the United States District Court for the District of Connecticut sustaining the Fink patent Number 1,581,188, granted April 20, 1926, for improvement in Process of Electrodepositing Chromium, etc., has been given wide publicity as an undoubted first step in an attempt by the United Chromium, Inc., to control the chromium plating industry throughout the United States. While the decision of the District Court is not final, and while we are reliably informed that a reversal may be expected on appeal, the decision as it stands is a serious menace to chromium platers throughout the country, as it may be, and indeed, is more than likely, to be used as a basis for applications for preliminary injunctions against many of them.

As you are no doubt aware, it has been the earnest conviction of many of those most conversant with the subject that Fink patent is invalid, and that other good defenses exist to its enforcement. In order to establish such defenses, however, and prevent great injustice to those dependent for their living upon activity in this industry, the facts must be brought to the attention of the proper judicial tribunal; and to insure this, we must be represented by competent patent counsel and have the necessary funds to make investigations, secure evidence, and to prepare our case so as to convince the court.

The Independent Chromium Platers' Association is an organization of those active in the industry in this locality who have recognized the menace of the Fink patent and possibility of its being used oppressively. Our association has employed competent counsel and has directed some preliminary work in investigating the situation generally for the information and protection of our members. We desire to secure the financial assistance and support of others similarly situated, and to this end are requesting you to join our association, and extend to us all assistance possible in securing and establishing a defense for any of our members who may be attacked by suit.

Membership in our association preliminarily requires a payment of $20.00. This money will be deposited by our Secretary and will be drawn against in accordance with the wishes of our members to defray legal expenses, and so far as it will go to cover the cost of defending any suit against any one of our members.

We want electroplating shops. We hope they join us, and that they do so promptly.

INDEPENDENT CHROMIUM PLATERS' ASSOCIATION,
C. A. Russill, Secretary.

1432 So. Grand Ave.,
Los Angeles, Cal.,
December 14, 1931.

Invention of the Crimped Wire Brush

Editor, THE METAL INDUSTRY:

I notice a long time ago that you were trying to find out who first used the crimped wire scratchbrush, and when.

I believe it was first used by Mr. Whitmore of Whitmore and Son, Allyn Street, Hartford, Conn., in 1889. Mr. Whitmore sold some of the wire brushes to the Rogers Cutlery Company, who were on North Main Street, Hartford.

W. H. LEGATE, President,
Techno-Chemical Laboratories.

Hartford, Conn.
January, 1932.

New Books

Brass and Alloy Founding. By H. B. Maynard. Published by the International Text Book Company, Scranton, Pa. Size 5 x 7½; 101 pages. Price $1.25.

This little book is the text used by the International Correspondence Schools in their home study course in the brass foundry. It was originally prepared by the late Jesse L. Jones of the Westinghouse Electric and Manufacturing Company (and Associate Editor of the METAL INDUSTRY), and rewritten later by the present author. It is a simple, concise booklet, describing the metals in general use in the brass foundry and the methods of making molds for casting them. Melting furnaces and furnace practice are covered in a second section.

The style of writing is simple and non-technical, for the apprentice or the beginner. It includes a considerable amount of information, however, of interest to the practical worker.

1931 Book of A. S. T. M. Tentative Standards. Size 6 x 9. 1,008 pages. Price $7 or $8 depending upon the binding.

The Book of American Society for Testing Materials Tentative Standards is an annual publication. The 1931 Book (1,008 pages) contains 180 tentative specifications, methods of test, definitions of terms and recommended practices in effect at the time of publication. The term "tentative" applies to a proposed standard published for one or more years, with a view of eliciting criticism, before it is formally adopted as standard by the Society. In the 1931 Book, 44 of the tentative standards relate to metals.

Specifications involving non-ferrous metals include magnesium-base alloy castings, copper-base alloys in ingot form for sand castings, aluminum-base and zinc-base alloy die castings.

Government Publications

Government publications are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., to whom proper remittance should be made to cover price where a charge is mentioned. In some cases, as indicated, applications should be made to the governmental body responsible for the publication.

Annual Report of Director of Bureau of Standards for Year Ended June 30, 1931. Misc. Pub. 131. 15 cents.

Commercial and Industrial Organizations Directory. Department of Commerce. Eighth edition, listing 19,000 organizations. Available at all offices of Bureau of Foreign and Domestic Commerce, or from Superintendent of Documents. 85 cents.

Federal Specifications Board, Washington, D. C., has issued circulars on Proposed Revisions of Federal Specifications listed below. The numbers should be used in requesting circulars from the Board, which will supply them free:

Bronze; Manganese, Castings. F. S. No. 370.
Brass; Castings, to be Brazed. F. S. No. 286.
Metals; General Specifications for Inspection. F. S. No. 339a.
Bronze; Manganese, Ingots (for Remelting). F. S. No. 89.
Bronze; Ingots. F. S. No. 290a.
Copper; Silicon. F. S. No. 119.
Copper; Phosphor. F. S. No. 118.
Copper; Ingots. F. S. No. 120.
Nickel; for Remelting. F. S. No. 371.
Solder; Spelter, for Brazing. F. S. No. 306.
Solder; Tin-Lead. F. S. No. 313.
Tin; Pig. F. S. No. 90.
Zinc; Slab (Spelter). F. S. No. 91a.
Tin; Phosphor. F. S. No. 116.
Wire; Phosphor-Bronze, Spring. F. S. No. 532.
Tubing; Aluminum Alloy (Aluminum-Manganese), Seamless. F. S. No. WW-T-711.

Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

SOLUTIONS SENT FOR ANALYSIS MUST BE PROPERLY PACKED, TO PREVENT LEAKAGE AND BREAKAGE. LABEL ALL BOTTLES WITH NAME AND ADDRESS OF SENDER. MAIL ALL SAMPLES TO 116 JOHN STREET, NEW YORK.

Black Lacquer on Aluminum

Q.—We should like to know the best way to finish a pressed aluminum part so that we could spray it with a black lacquer and have it stick.

We have sometimes put a black nickel on top of the aluminum, but even then have had a hard time making the black lacquer finish satisfactory. We would appreciate very much your comment both as to what the black nickel should be and preparation of the finish before putting on the black lacquer, and what you would suggest in pigmented black lacquer.

A.—In preparing aluminum for an enameled finish it is necessary to have the surface chemically clean. The use of a hydrocarbon, such as carbon tetra chloride or gasoline is suggested to be used to remove any heavy grease or oil that is left on the work from the pressing operations. This is followed by a cleansing in a mild alkaline cleaning solution which can be obtained from the manufacturers of prepared cleaners who advertise in the BRASS WORLD. The work is then dipped in an acid dip made of 2 parts sulfuric acid and 1 part of nitric acid, so as to slightly etch the surface of the aluminum.

This operation is followed by a dip in a cyanide solution, then a cold and hot water rinse and dried in clean hardwood sawdust.

The work is now ready to be primed and a special primer is used. For this material consult the lacquer manufacturers who advertise in the BRASS WORLD. After the priming operation, the work is ready to be enameled, and any good grade of enamel can be used.

O. J. S., Promblem 5,052.

Check Analyses

Q.—Would you kindly give me the information on the following analyses. We are having trouble with solution because the nickel chips on the ends. We are sending five samples of solution for analysis and we would like to know if they are right.

Our own laboratory report as follow:

No.	Metallic Nickel	Chlorides	P. H.
1	1.6	2.0	6.3
2	2.2	3.2	6.2
3	2.3	2.5	6.1
4	2.2	3.6	6.1
5	2.1	3.7	6.0

A.—Analyses of nickel solutions:

No.	Metallic Nickel	Chlorides	pH.
1	1.68 ozs.	2.06 ozs.	6.2
2	2.12 ozs.	3.19 ozs.	6.2
3	2.32 ozs.	2.48 ozs.	6.1
4	2.12 ozs.	3.48 ozs.	6
5	2.13 ozs.	3.62 ozs.	6

The analyses of these solutions check very closely with your analyses.

O. J. S., Problem 5,053.

Brass in Permanent Molds

Q.—Would you kindly send me any information you have on permanent molds? Also any information as to results that the plumbing brass foundries are having with permanent molds.

A.—One of the articles we would refer to is an article in THE METAL INDUSTRY, May, 1930, p. 216, by Henri Marius. He gives a lot of good information and seems to have gone into the permanent mold business very extensively as far as red bronze is concerned.

Aluminum bronze has been cast in permanent molds for a long time.

So far as the plumbing brass foundry is concerned, we have no information of this class of work being done in permanent molds, outside of valve stems which are cast in manganese bronze in permanent molds, mostly, however, in the larger sizes, from 6 inches up.

W. J. R., Problem 5,054.

Butler Finish

Q.—We have a job, calling for Butler finish on some hardware for automobiles. Will you kindly tell us just what the operations are to produce this so called Butler or satin finish.

A.—A silver butler finish is produced as follows: The work should be polished to a finish and then silver plated. After silver plating for a sufficient thickness of silver, oxidize in a sulphur solution made of ammonium sulphide 1 ounce, water 1 gallon, used hot.

The work is then relieved by using a soft rag wheel and a fine grade of pumice and water. The finish must be lacquered for protection against tarnish or stain.

If a dull finish is desired, instead of the polishing operation substitute a satin wheel operation.

If you will send us a sample of the finish desired, we will be pleased to advise you further.

O. J. S., Problem 5,055.

Imitation Antique Silver

Q.—We have been told that it is possible to imitate a genuine antique silver finish by cadmium plating and oxidizing. Will you let us know if you have any information along these lines, and if so, just what formula or practice to follow?

A.—A finish that somewhat resembled an antique silver or silver oxidize finish may be produced by cadmium plating the work and then oxidizing the cadmium by using a solution made of antimony oxide 2 ounces, caustic soda 4 ounces, water 1 gallon.

The relieving methods are the same as those used for silver oxidized finishes.

O. J. S., Problem 5,056.

Oxidized Metal

Q.—Now I am still having trouble making phosphor bronze. We are melting 600 pound heats in a 42 inch furnace open flame and this is how our heat is made up of all new metal.

77 lb. ingot copper
10 lb. lead 99% pure
10 lb. tin
4 lb. phosphor copper, 15% guaranteed.

101

and here is what our castings analyze.

Copper	80.10
Tin	10.37
Lead	8.92
Iron	.01
Aluminum	.09
Phosphorus	.44
	99.93

We have run into a new and unexpected trouble. Our castings when turned up are full of small holes no matter at what heat we pour them in. I am using two pyrometers, one to check up against the other and have them tested to see that they are all right. I am enclosing a small piece of the stuff that is giving us our new trouble which scales off the casting and shows all through our casting when turned up. What it is I do not know. I have made the same metal in a furnace with crucible and poured with a crucible and got the same results and do not know where to look for the cause. I have made hundreds of thousands of pounds of phosphor bronze in crucible furnaces and never had any trouble to make good castings. So I am beginning to think it is something that has got into the metal. We have three 42 inch furnaces, two 60 inch and one 30 inch furnaces and we use 14 ounces of air pressure and 15 pounds of oil, mercury gauge. Also use heaters to keep the oil up to about 150° F. To line and patch our furnace we use 1 part of fire clay, 3 carbo sand, 3 hot patch; the same to line our ladles.

Our method of melting is this: We melt our copper to 2000° F.; add our tin lead and phosphor copper, stir up well with skimmer iron, turn the furnace over and pour out into ladle, stir well before pouring and pour four to five molds at a time; stir every 2 or 3 molds. Our sand in No. 1 and 2 mixed together and to keep from burning in. We spray on our molds, sometimes with silver lead that we pay 7 cents per pound for and at other times we use a white talc, but the results are just the same. We put two or three blocks of wood in the bottom of our furnace before we put our metal in. We have also tried small coke instead of the wood, but the results are just the same.

A.—On examination of the material you sent, we find the cause of your trouble to be oxidized lead and phosphorus, and feel quite sure your trouble is oxidization. We suggest to you if possible to raise your air pressure on your oil to 18 to 20 ounces and the oil pressure to 25 to 40 pounds. In charging the furnaces add 3 pounds of your phosphor copper with the copper. This will eliminate to a certain extent the oxidization that takes place in melting the copper. I also might state that I found foundries that have trouble, same as you speak of, and after exhaustive research we located the trouble in the pouring ladle, because by heating the pouring ladle before pouring, in any oil heater for ladles, where the oil plays directly into the ladle, sometimes there will not be the proper combustion of the oil. In other words the oil runs in the ladle and gets under the lining and gives off a gas. This may be detected by watching the metal as it is poured into the ladle. If it boils in the ladle, the indications are that you will have oxidized metal and defective castings same as you speak of.

So to overcome the difficulties you are having we recommend the following: Increase the air pressure to 18 ounces and the oil to 25 pounds. Add 2½ pounds of the phosphor copper with the copper, putting the phosphor copper on the bottom of furnace before charging the copper. Use a crucible previously heated in the coke fire for pouring. Also suggest that you use a facing for this work mixed as follows: 17 parts heap sand; 3 parts new sand; 1 part pitch compound, same as used for core making.

W. J. R., Problem 5,057.

Peeling Nickel Over Copper

Q.—We are today sending you under separate cover a solution of our nickel plating tank, also our copper tank, which we wish to have analyzed. We have had trouble with our plates peeling. We have cleaned our tanks which did not help matters. We operate a still tank at about 2½ volts and 70 to 90 amperes.

A.—Analysis of nickel solution:

Metallic Nickel	10.20 ozs.
Chlorides	4.19 ozs.
pH	5.2

The low pH of the solution is undoubtedly the cause of the deposit raising. Would suggest that you add 12 fluid ounces of 26° ammonia to each 100 gallons of solution. If this correction to the solution does not stop the peeling, then it will be necessary to reduce the volume of the solution one-half and then replenish by adding water.

Analysis of cyanide copper:

Metallic copper	3.12 ozs.
Free cyanide	.33 oz.

The free cyanide content of the solution is too low. Add ½ ounce of sodium cyanide to each gallon of solution.

O. J. S., Problem 5,058.

Porous Metal

Q.—Under separate cover we are sending you a curved piece used on some of our equipment which clearly shows defects. We are also sending you pieces No. 8 and No. 5. On No. 5 you will notice the finish of the original casting before the finishing is done.

We are trying very hard to learn the exact cause of some of the defect, and we would greatly appreciate your views.

A.—On examination of the samples we find the metal porous. If you will look at them under the glass you will find runs through the casting. On machining them it does not show up, but it does after chrome plating, which is taken up in the porous spots and given off, which makes the casting show up badly.

This defect is probably in the alloy and is caused either by your using scrap metal that contains impurities or it is in the ingot that you are purchasing. Or, it can be caused by the method of melting. For chrome plating work, it is essential that the metal be pure and solid and free from oxides.

We suggest for this class of work that you use new metal and melt in a crucible and charge all your copper in the pot. Do not let any of it melt on the side or top of your furnace. Add a handfull of borax to the copper as it melts. Get the copper good and hot. Add the lead and tin. Stir well, then add the zinc. Just before pouring, add about 2 ounces of 15% phosphor copper to the crucible.

W. J. R., Problem 5,059.

Silica in Copper Alloys

Q.—We make, from time to time, copper alloys with the higher silicon contents (about 5%) and besides, customary additions, having only zinc up to 10%. During the pouring of these alloys, we find constantly a skin of oxide on the metal which resembles in appearance the effect of aluminum in similar alloys. The melting is done in graphite crucibles with a charcoal cover. As soon as this copper is removed the above mentioned skin appears, which later goes into the casting and has a very bad influence on the strength of the metal.

Can you give us a way to eliminate this skin either through the addition of suitable alloy constituents or through a better charging and covering method. What is there that can prevent this skin formation?

A.—In reference to silicon alloys of copper and zinc, silicon seems to produce the same formation on the metal as aluminum in copper alloys, and we suggest the same method as used for casting manganese bronze and aluminum bronze to correct defects in this alloy. It is the practice in casting these alloys to allow the metal to enter the mold at the lowest point with the least agitation possible, and when possible to give the metal a long run before entering the mold. We also suggest trying as a deoxidizer ¼ to ½ per cent of 30 per cent manganese copper to be added to your mixture. This may help. We do not know of any flux or covering that will prevent this skin formation. W. J. R., Problem 5,060.

Patents

A Review of Current Patents of Interest

Printed copies of patents can be obtained for 10 cents each from the Commissioner of Patents, Washington, D. C.

1,827,142. October 13, 1931. **Process for the Treatment of Aluminum.** Martin Kristensen de Trairup, London, England.

A process for preparing the surface of aluminum for receiving subsequent treatment of the nature of electroplating, dry-tinning and soldering, consisting in depositing an amalgam on to the aluminum surface in an electrolytic bath containing a solution of salts of mercury and tin.

1,827,204. October 13, 1931. **Method of Protecting Metal Surfaces.** Sumner Redway Mason, Wilmette, Ill., assignor to Western Electric Company, Incorporated, New York.

A process for protecting surfaces of metal articles, which consists in subjecting an article as a cathode in a bath containing 65 grams of potassium dichromate per liter to an electric current of a cathode current density below the range in which chromium is deposited for from 5 to 15 minutes and maintaining the bath at room temperature.

1,827,247. October 13, 1931. **Method of Protecting Metal Surfaces.** Sumner Redway Mason, Wilmette, Ill., assignor to Western Electric Company, Incorporated, New York.

A process for protecting surfaces of metal articles, which consists in connecting an article as a cathode in an electrolytic cell including a bath containing chromic acid as an electrolyte, passing an electric current of a cathode current density below the range in which chromium is deposited through the cell.

1,827,478. October 13, 1931. **Hanger for Articles to be Plated.** Louis Lichtman, New York, N. Y., assignor to Chromeplate, Inc., New York.

In a device of the class described, a holder for articles to be electro-plated, comprising a substantially U-shaped member including resilient arms lying alongside each other and connected at one end, the other ends of the arms being adapted for connection with a support for the member.

1,828,701. October 20, 1931. **Method of Improving Metals, and Product Thereof.** Ernest S. Fisher, Salt Lake City, Utah, assignor of Utah Metals Flux Company, Salt Lake City, Utah.

The method of improving metals which comprises contacting the same in heated state with a composition substantially identical with the carbonaceous shale found in the northern central portion of Emery County, Utah, south of Price River and Desert Lake.

1,829,116. October 27, 1931. **Process for the Coating of Metals Upon Cement Surfaces.** Speranza Seailles, nee Calogeropoulos, and Jean Seailles, Paris, France, assignors, by mesne assignments, to Alfred P. Bourquardez.

A process for the coating of metals upon cement surfaces in which the metal is disposed upon the walls of a mould in the form of a powder mixed with a volatile substance offering no prejudice to the setting of the cement, the cement being then run into the mould, subjeced to compression by suitable means, allowed to dry, and finally removed from the mould.

1,829,320. October 27, 1931. **Crucible Furnace Lining.** Harold E. White, Butler, Pa., assignor to Lava Crucible Company of Pittsburgh, Pittsburgh, Pa.

A crucible melting furnace comprising a casing open at the top, a lining for the casing, said casing having a bottom supporting said lining and adapted to support a crucible, said lining comprising superposed rings of refractory material insertible through said top.

1,829,623. October 27, 1931. **Process of Treating Metals.** James G. E. Wright, Alplaus, N. Y., assignor to General Electric Company, a corporation of New York.

The process of protecting metallic articles from oxidation or corrosion which consists in covering the surface of the article with a mixture of another metal in powdered form and a substantially volatilizable alkyd resin binder, and then firing at a temperature which will cause the powdered metal to alloy with the metal of the article.

1,829,635. October 27, 1931. **Method of Making Alloys.** Wheeler P. Davey, State College, Pa., assignor to General Electric Company, a Corporation of New York.

The method of making an alloy from normally base forming metals which consists in converting a mixture of mutually non-reactive solutions of compounds of the metals desired in the alloy to an intimate physical non-colloidal mixture of mutually non-reactive compounds which are reducible, and then reducing said mixtures to the metallic state.

1,829,668. October 27, 1931. **Aluminum Alloy.** Weston Morrill, Pittsfield, Mass., assignor to General Electric Company, a Corporation of New York.

An alloy containing about 8% manganese, about 8% silicon, the remainder of the alloy consisting substantially of aluminum.

1,829,903. November 3, 1931. **Alloy.** Robert H. Leach, Fairfield, Conn., assignor to Handy & Harman, New York.

An alloy which consists of silver varying from about 10% to about 25%, copper varying from about 67% to about 88%, and phosphorus varying from about 2% to about 8%.

1,830,142. November 3, 1931. **Aluminum Alloy.** Cyril S. Taylor, New Kensington, and Junius D. Edwards, Oakmont, Pa.

An aluminum alloy of low electrical conductivity containing from about 0.5 to about 8% of manganese, and one of the elements zirconium, vanadium and chromium in amount of not less than about 0.05% and not more than about 3%.

1,830,343. November 3, 1931. **Method of Electrodepositing Metals and Apparatus Therefor.** Marvin J. Udy, Niagara Falls, N. Y.

In electroplating apparatus for plating sheets, means for obtaining uniform deposition over the sheet to be plated, comprising a conductor having a multiplicity of relatively sharp projecting portions biased to engage the sheet and form a discontinuous contact area therewith, said contact being of a limited point or line character.

1,831,023. November 10, 1931. **Process of Manufacture of Aluminum-Silicon Alloys.** Eugène Mathieu, Annecy, René Perrin and André Greffe, Ugine, and Serge Cavalieri, Marignier, France, assignors to Société d'Electro-Chimie, d'Electro-Metallurgie et des Acièries Electriques d'Ugine, Paris, France.

A process of obtaining aluminum-silicon alloys which comprises slowly cooling an alloy obtained directly from the electric furnace, thereby effecting crystallization of the silicon in the alloy in the form of large crystals, and subjecting the resultant mass to liquation at a temperature slightly above the fusion point of the eutectic.

1,831,091. November 10, 1931. **Metal Recovering Apparatus.** Claude E. Bowers, Los Angeles, Calif.

An apparatus for removing coatings from scrap metal comprising a drum rotatably mounted, a plurality of partition plates in said drum having openings therein, a diagonally disposed plate in each compartment joining said partition plates, a closure plate having an opening therein through which a charge of scrap and a solvent is introduced into the first compartment of said drum.

1,831,241. November 10, 1931. **Nonferrous Alloy.** James B. Grenagle, Baltimore, Md., assignor of one-half to William W. Varney, Baltimore, Md.

An alloy consisting of tantalum in the proportion of from 30 to 50 per cent, of niobium in the proportion of from 12 to 26 per cent, of yttrium in the proportion of from 8 to 12 per cent and of uranium in the proportion of from 8 to 12 per cent.

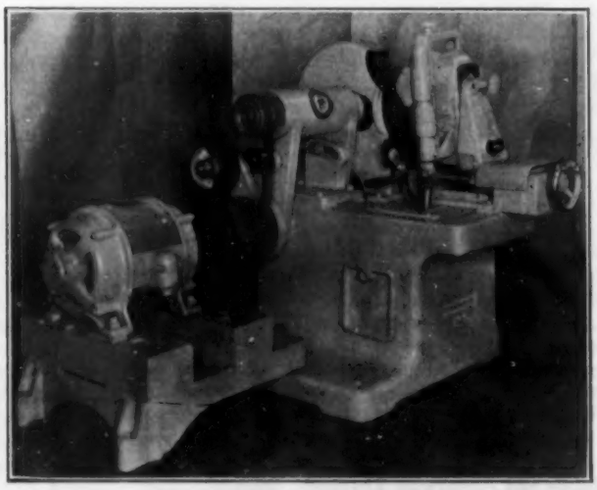
Equipment

New and Useful Devices, Metals, Machinery and Supplies

Centerless Feed Polisher

Production Machine Company, Greenfield, Mass., offers a new type of polishing equipment in its new No. 101 "Centerless Feed" machine. This is equipped with a new type of belt feeding device on which this maker has patents, which is stated to eliminate the necessity of skilled polishing labor.

According to the company, this new production unit provides a high speed polishing and buffing equipment which is capable of cutting down from the rough and carrying the work through to a high finish rapidly and economically. Cylindrical work up to 6 inches in diameter can be handled.



New "Production" Polisher.

Specifications stipulate heavy mountings, Dodge-Timken antifriction bearings, Alemite lubrication, triple V-belt drive from motor, provision for quick set-ups, and complete protection by hoods and guards.

Complete data will be supplied to readers on application to the manufacturer's Department MI.

Spotting Out Eliminator

Crown Rheostat and Supply Company, 1910 Maypole Avenue, Chicago, Ill., offers a process and equipment for eliminating the defect in electroplated coatings known as spotting out. It is known as the "Smidel Spotting Out Process and Eliminator," and consists of a combination of chemical and mechanical treatment which forces the spotting out to occur immediately, and then eliminates it without affecting the color in any way, the company states. The process was developed by Oscar G. Smidel after a long period of experimentation.

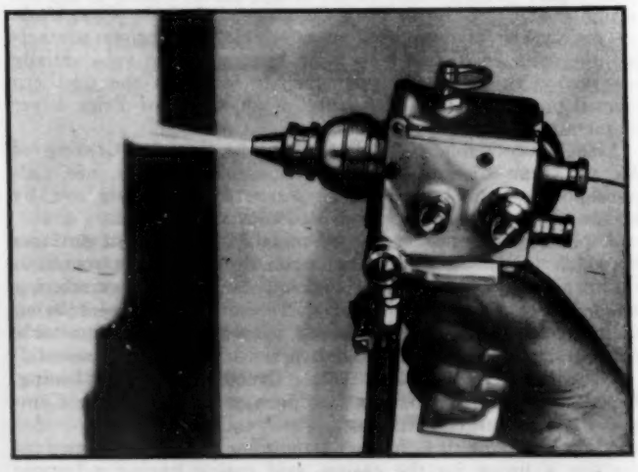
The process is additional to the electroplating and requires its own equipment. The company states that articles subject to spotting out can be guaranteed against such spotting after being treated and lacquered. Complete tests under actual production conditions and adoption of the process by finishers troubled with spotting out put it beyond the experimental stage, the company states. Readers desiring complete data should address the company directly.

"Petal-Sewed" Buffs

The Hanson-Van Winkle-Munning Company, Matawan, N. J., has recently developed a pieced buff with what is termed "petal sewing." The principal feature is a new type of sewing, which is said to give the buff a cushion face of even density at all stages of wear. This buff is made from especially selected bleached cloth of high quality, and can be furnished in three sewing densities designated as 16, 24 and 32 point; the 16 producing an exceptionally soft buff suitable for coloring, and the 24 and 32 point being harder and stiffer and intended primarily for cutting down. This buff takes its name from the resemblance of its sewing to the petals of a flower, the number of points indicating the number of petals. The petals cross, forming pockets, and the pockets are narrower toward the center of the buff so that as the diameter decreases the buff is slightly harder, which compensates for the reduced peripheral speed. The petal-sewed buff is produced in 14 and 16 inch diameters only.

New Metallizing Process

A new process and equipment for metallizing metallic and nonmetallic surfaces by means of a gun which sprays molten metal is offered by the Metallizing Company of Los Angeles, Ltd., 1218 Long Beach Avenue, Los Angeles, Calif. The equipment consists of a gun of new design which sprays molten metal such as zinc, nickel, lead, tin, Monel, bronze, copper, aluminum, brass, etc., which is fed into the gun in the form of wire. The makers state a very wide variety of decorative finishes can be produced on inflammable as well as non-inflammable objects, while a major function of the process is in producing protective coatings to prevent corrosion, weather attack on perishable articles, etc. The company states that the process has been found highly efficient and practical, and they mention reduction of costs of castings and plant and equipment upkeep as important advantages.



Spray Head for Metallizing Process.

The gun is sold outright, and full technical service is provided to purchasers, as well as complete manual of operation and bulletins as new uses are developed. Readers desiring full information should apply directly to the company.

Ball Burnishers

A line of ball burnishers comprising four sizes of machine, equipped with motors or with pulleys for belt drive, is offered by Lasalco, Inc., 2828 Lasalle Street, St. Louis, Mo. The maker's description states that these machines are equipped with maple-lined gray iron barrels as standard. The barrel is centrally supported and balanced on roller bearings running between steel races. Welded steel or unlined cast steel barrels are available on specification. Ease of loading and unloading is said to be assured by means of a worm-geared tilting device, and barrel may be held

Motor-Driven Model of New Lasalco Ball Burnisher

in desired positions without locking. Specially designed steel cover closes the barrel, fastening in place by a single operation of a central wheel. Cover has permanent packing.

Motor-driven machines are equipped with motors running at 1,750 r.p.m., which drive the machine through a V-belt and pulley. Belt-drive machines are supplied with suitable pulleys. The machines are designated by numbers from 1 to 4, their respective capacities being 5, 8, 13 and 14 pecks with lined barrels, and 7, 13, 20 and 23 pecks unlined. The illustration shows the No. 3 motordriven burnisher.

Lasalco, Inc., also supplies burnishing agents such as balls, diagonals and ballcones.

Teletypewriter Service

A new communication service, designed particularly to meet the requirements of business firms, has been made available by the American Telephone & Telegraph Company and its associated companies. This service—a new teletypewriter service—does for the typewritten word what telephone service does for the spoken word. Each subscriber is provided with one or more teletypewriters which are connected electrically by wires to the nearest teletypewriter switching point or "central." Messages typed on a teletypewriter, which is similar in appearance and operation to an ordinary typewriter, are instantly and accurately reproduced on any other teletypewriter to which it is connected. Teletypewriter "centrals" have been established at numerous points throughout the United States and are all interconnected. Any subscriber to the new service can, therefore, be connected to and communicate with any other subscriber, whether in the same city or in a distant city.

The new service provides two-way communication, subscribers being able to type back and forth on the same connection. Inquiry and immediate reply is, therefore, possible and any ambiquities can be clarified at once. Standard business forms for orders, reports, deliveries and similar matters may be used or messages may be typed directly on paper of letter-size width. As many as six copies can be made by each teletypewriter.

New Brazing Alloy

The unique brazing qualities of "Sil-Fos," a new low melting point alloy recently developed by Handy and Harman, 57 William Street, New York, have been recognized by the granting of U. S. Patent No. 1,829,903, according to that company.

"Sil-Fos" is recommended by the manufacturers for use on copper, brass, bronze, nickel, nickel-silver, extruded brass and bronze, Monel metal and other non-ferrous metals and alloys fusing above 1300°F. They state that it contains a sufficient percentage of silver to give it easy flowing, penetrating and alloying properties. Joints are described as strong, sound, ductile and corrosion-resisting. Tests on copper lap joints are reported as showing tensile strength varying from 30,000 to 35,000 lbs. per sq. in.

The phosphorus in "Sil-Fos" acts as a deoxidizer, requiring but little flux and in some cases—mainly in joining copper—no flux at all. This avoids considerable cleaning and tends to insure better results in the hands of the average workman, it is stated. The melting point is given as 1300° F., which is even lower than silver solders containing less than 50% silver. The use of "Sil-Fos" is said to be surprisingly economical for a silver alloy. It is sold by the pound in standard sizes of strips, roads and pulverized.

Automatic Polish Composition Feeder

Hammond Machinery Builders, Inc., Kalamazoo, Mich., has developed and placed on the market a device which will automatically feed polishing composition to automatic, semi-automatic or hand polishing or buffing machines. It is applicable to machines now in service, and the makers state it is a means of materially reducing finishing costs.

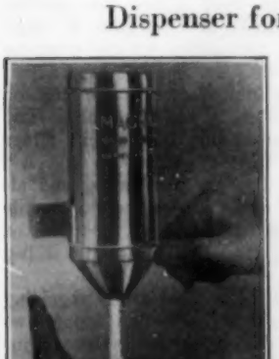
New Hammond Automatic Polishing Composition Feeder

The equipment, shown in the illustration, operates by compressed air, delivering the composition paste through a nozzle to the polishing or buffing wheel, whose centrifugal force carries the composition to a collector pad clamped on the end of the nozzle. The pad presses against the wheel. Exact amount of composition can be fed constantly or intermittently, as required, a hand or foot control being provided for intermittent feeding.

Discharge spout on feeding nozzle is adjustable to wheel contours, which may be flat, irregular, curved, etc. Nozzle is supplied in sections and can be built up to suit all wheel widths. Compositions in paste form are available in drums for use with the unit, including tallow, tripoli, stainless steel composition, white lime, etc.

Readers desiring complete data on the device should communicate with the Engineering Department, Hammond Machinery Builders, 1600 Douglas Avenue, Kalamazoo, Mich.

Dispenser for Hand Cleaner



New Magnus Product

The importance of getting just the right amount of cleansing material for washing hands is said to be satisfactorily met by a new type of dispenser put out by the Magnus Chemical Company, Garwood, N. J. This dispenser measures out into the hand the right amount of cleaner to use with each push of a sturdy spring plunger. Cadmium-plated and rustproof, the dispenser is designed to stand long usage. The top fits on tightly, yet is easily removable for reloading the dispenser. The strong spring on the plunger insures there being no leakage, the makers state.

Brass Die Castings

Doehler Die Casting Company, 386 Fourth Avenue, New York City, announces a new alloy for brass die castings, known as "Brastil," which will be licensed under pending patents. The company states that the die castings produced from this copper alloy have strength equal to steel, and the following properties are given: tensile strength (ult.), 90,000-95,000 pounds per square inch; elongation, 10-17% in 2 inches; Brinell hardness, 160-180 (3,000 kg.); copper content, over 81%. Other unusual properties mentioned are fatigue and shock resistance, bearing qualities, machinability, corrosion resistance, white gold color.

Readers desiring further information should apply direct to the company.

Stoneware Pipe for Acid Waste

The advantages of chemical stoneware pipe for acid waste lines in the plating and processing industries are discussed in a recent article by Howard Farkas, vice-president of The United States Stoneware Company, 40 Church Street, New York. Pointing out that platers generally fail to distinguish between chemical stoneware pipe and sewer pipe when installing acid waste lines, because plumbers commonly interpret such terms as "vitrified pipe," "clay pipe," or "earthenware pipe" to mean ordinary sewer pipe, he says that to use such material for conducting acids and other corrosive wastes is to invite premature failure and economic waste.

Chemical stoneware is made of special material which contains no iron, lime or other injurious matter, says Mr. Farkas. It is neat, well-vitrified, weathered, fired,—a highly technical ceramic product requiring great skill and experience to manufacture. Tanks, vats, rolls, jars and pots are some of the stoneware products used by platers. Common sewer pipe is made of low grade, impure, untreated materials which are susceptible of burning and corrosive attack, he says. It has short hubs which cannot be properly caulked for acid handling; lengths are short; and surface is rough and collects sediment.

Chemical stoneware, which is a recognized acid-resistant material, has none of these disadvantages, according to the article. Standard lengths are 60 inches; hubs are 4 inches deep, with both spigot and hub ends well corrugated for satisfactory jointing. It is available with a glossy inner and outer surface having a very low hydraulic friction coefficient, preventing collection of sediment. He sums up by giving five outstanding advantages of chemical stoneware for acid drains, as follows:

Positive resistance to corrosion by acids, alkali and other corrosive materials; toughness, durability, high abrasion resistance; ease of installation; low first cost; no necessity of special maintenance precautions.

In conclusion, Mr. Farkas points out that chemical stoneware pipe will withstand the corrosive action of hydrochloric acid at any time of the year, and that the pipe will outlast any building in which it is installed.

Plating Tank Rheostats

The Columbia Electric Manufacturing Company, 1292 East 53rd Street, Cleveland, Ohio, announces that its latest design of plating tank rheostats for medium and heavy currents up to 10,000 amperes capacity, include important improvements. The strong, easily replaced grid-resistor unit parallel-connected construction has been retained, but the toggle-operated "wiping surface" contactors have been redesigned to eliminate the necessity of current passing through the contactor pin or other working parts. The former single-contact flexible brushes have been replaced by double-ended contact brushes which are forced by the toggle cams against the copper blocks. This double "wiping contact" and its cam, combined with the cadmium plating which is provided on all exposed surfaces, assures exceptionally low resistance to the passage of the current, and reduces attention required, it is claimed.

Safety Barrel Handler

The importance of using proper acid handling equipment is attested by statistics on accidents. During a recent 12 months there were 219 serious acid injuries reported to the New York State Industrial Commission, according to Schwenk Safety Device Corporation, 27 Water Street, New York. This company announces an improved carboy tilter, designed to prevent such accidents and enable one man to safely truck, drain, and otherwise handle carboys of liquids.

Acid Carboy Holder

The new equipment is an improvement in that the carboy is elevated into the tilter by levers. The operator does not directly lift the carboys, which often weigh 200 pounds or more.

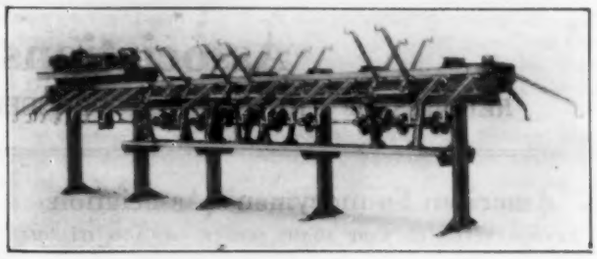
The cradle wherein the carboy box rests provides support on three sides and bottom, so that there is no danger of the bottle dropping through the box even if the wood is in bad condition. Operator has full control in pouring at all times regardless of the amount of liquid in the carboy, it is stated. Every drop of fluid can be drained from the bottle. The unit has the approval of various safety organizations.

Change Name of Alloy

Owing to the confusion which can possibly occur in the use of the name "Perm-Brite," due to trade names somewhat similar now in use in the non-ferrous industry, the Apex Smelting Company, Chicago, Ill., has discontinued the use of this name for their new aluminum alloy. Henceforth, this metal will be advertised and sold under the name of "Apex 400 Alloy." The alloy was described in THE METAL INDUSTRY for June, 1931, page 269.

Midget Processing Conveyor

The Meaker Company, 1615 South 55th Avenue, Chicago, Ill., has placed on the market a very small metal processing and finishing conveyor which is fully automatic. The "Midget" machine is described as requiring low celling height, minimum floor space, and is said to be priced to compete with hand equipment installations for the same work. It can be moved from one department to another. Among its uses the makers list plating, pickling, rinsing, washing, lacquer dipping, drying and other processes where quick washes, rinses and dips are needed. Chromium plating is listed as an application to which the machine is particularly suitable.



Meaker "Midget" Conveyor.

The manufacturer's description of the machine indicates several departures in conveyor construction and operation, with such advantages claimed as elimination of complicated conveyor mechanism, no undue strain on conveyor, close arm spacing, shortest possible transfer periods, etc. The maker also stresses the advantage of the machine's flexibility to variety of uses, such as for various kinds of plating, electro-cleaning, anodic treatment of aluminum, pickling, dipping, washing, drying of varieties of work. Another feature is portability, the machine being movable practically without disassembly, since it is usually shipped set up and ready for bolting to plant floor. It is also pointed out that the machine is built of standardized parts.

Readers desiring full information should address the company directly.

Equipment and Supply Catalogs

Heavy Duty Roll Lathes. United Engineering and Foundry Company, Pittsburgh, Pa. Bulletin L-1201.

Lever Shears. United Engineering & Foundry Co., Pittsburgh, Pa. Bulletin on shears for rolling mills.

Welding and Cutting Equipment. Bastian-Blessing Co., 240 E. Ontario Street, Chicago, Ill.

Trade Directory. Merchants' Association of New York, 233 Broadway, New York. Year Book for 1931, listing membership, etc., classified.

Heavy Duty Roll Lathes. United Engineering and Foundry Company, Pittsburgh, Pa. Bulletin L-1201, 16 pages, illustrated.

Stewart Melting Pot. Chicago Flexible Shaft Co., Chicago, Ill. November issue of a pamphlet on industrial furnaces and kindred equipment.

Refractories. McLeod & Henry Co., Troy, N. Y. Bulletin on silicon-carbide super-refractories for lining furnaces, kilns, retorts, muffles, etc.

Motors. The Master Electric Co., 100 Davis Avenue, Dayton, Ohio. Data Book Section 210, on geared head motors for speed acceleration or reduction.

Silver. Handy & Harman, 57 William Street, New York. Leaflet on the increasing demand for silver jewelry and other products. Very interesting.

Silica and Quartz Ware. The Thermal Syndicate, Ltd., Schenectady and Atlantic Avenues, Brooklyn, N. Y. Bulletin on "Vitreosil" laboratory ware.

Rotary Hearth Furnace. W. S. Rockwell Co., 50 Church Street, New York. Furnace for heat-treating and forging non-ferrous and ferrous metals; electric or fuel.

Heat Treating. National Safety Council, Inc., 20 N. Wacker Drive, Chicago, Ill. No. 1 of the Industrial Safety Series, covering safe practices in heat treating.

Burnishers and Tumblers. Lasalco, Inc., 2822 La Salle Street, St. Louis, Mo. Bulletin 92, featuring some new equipment added to this maker's line.

The Consulting Chemist and Your Business. Foster D. Snell, Inc., 130 Clinton Street, Brooklyn, N. Y. Interesting booklet outlining the services the firm renders.

Small Motors. Wagner Electric Co., 6400 Plymouth Avenue, St. Louis, Mo. 30-page bulletin on single-phase, polyphase and d. c. motors in fractional horsepower ratings. Profusely illustrated.

Modern pH and Chlorine Control. W. A. Taylor and Company, Inc., 872 Linden Avenue, Baltimore, Md. New 50-page treatise by W. A. Taylor and F. R. McCrumb, giving considerable technical information, and a catalog of equipment.

Inventory Information. The Barrett Bindery Company, 1328 West Monroe Street, Chicago, Ill. "How to Take Inventory in a Manufacturing Plant" is an interesting 32-page booklet offered gratis on request.

Form Turning Machine. The Monarch Machine Tool Company, Sidney, Ohio. 28-page catalog on new Keller-Monarch machine, a combination of helical geared lathe and Keller automatic electric controls, for machining irregular contours.

Solvents. Roessler and Hasslacher Chemical Company, Niagara Falls, N. Y. Two new folders: "Trichlorethylene," and "R & H Non-Flammable Solvents." Also: **Sodium Perborate,** uses and properties; **Electrotinning** with the R & H sodium stannate-acetate plating bath.

Optical Instruments for Examining and Analyzing Metals. Bausch and Lomb Optical Company, Rochester, N. Y. An interesting 126-page book giving a great mass of data on metallography, microscopy, etc., and a complete catalog of equipment. Free on request, which should be on company stationery.

Aluminum Alloy Castings. The British Aluminum Co., Ltd., 122 E. 42nd Street, New York. Good illustrated booklet on aluminum castings of various types. Also, **Aluminum for Architecture,** similarly well illustrated and of considerable interest to founders and others concerned with production or use of architectural aluminum forms.

Architectural Finishes for Aluminum. Aluminum Co. of America, Pittsburgh, Pa. Specifications for finishes on alloy sand castings. A. I. A. File No. 15-J. A very good publication on the subject, giving the standard finishes which have proved to have permanency and all other requirements. Complete data are given for producing the finishes.

Electric Furnaces. Ajax Electrothermic Corporation, Trenton, N. J. Bulletin 7, superseding Bulletin 4, on spark gap type high frequency furnace equipment for laboratory and small scale production work. A number of new developments are listed, including new types of furnaces, refractories, crucibles, precious metal melting equipment, and a temperature chart giving Centigrade-Fahrenheit equivalents up to 3500°C. (5612°F.).

The Season's Greetings!

THE METAL INDUSTRY wishes to express its high appreciation of the greetings, calendars, souvenirs, etc., sent by the following friends:

The American Brass Company, Waterbury, Conn.
General Electric Company, Schenectady, N. Y.
Irving Trust Company, New York.
Link-Belt Company, Chicago, Ill.
C. L. Mantell, Brooklyn, N. Y.
Pennsylvania Railroad, New York.
Technical Press, New York.
United Engineering and Foundry Company, Pittsburgh, Pa.
West Virginia Pulp and Paper Company, New York.

Associations and Societies

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

American Foundrymen's Association

HEADQUARTERS, 222 WEST ADAMS STREET, CHICAGO, ILLINOIS

Activities of the American Foundrymen's Association were broadened considerably during the past year, reaching out into new fields of technical foundry research and bringing to light data of extreme value to every member of the industry. Owing to the fact that more members of the Association participated in the work of the various committees which accomplished this, it is logical to assume that the results of their cooperative efforts reached more foundries, for their mutual advancement.

Not a small factor in this widespread dissemination of information for improvement of casting practice was the Annual Convention of the Association, held at Chicago in May. From the standpoint of valuable papers presented, the variety of commercial exhibits of foundry products, and the vigorous pursuit of knowledge by those who attended, this event ranks as one of the best in the history of the A. F. A.

A number of outstanding technical treatises were published and distributed by the Association during the past year, reflecting the trend of foundry thought in dealing with modern casting problems. All of these deal with vital problems of the modern foundry.

One outstanding development of the past year has been the taking of determined steps to place before the engineers responsible for the designing of metal parts, accurate and up-to-date information on developments in and properties of the cast metals of today. To this end, a series of joint symposiums was initiated between the A. F. A. and the American Society for Testing Materials, the first of these being held last June and dealing with malleable cast iron. Other symposiums on cast steel and nonferrous metals are being arranged for future meetings of the A. S. T. M.

Further efforts to emphasize the importance of considering foundry practice in the designing of castings were stressed at a joint meeting of the A. F. A. and the Philadelphia Foundrymen's Association, held in Philadelphia this January. Both engineers and foundrymen of that district participated in the program, and other meetings of a similar character and purpose are being arranged for the current year.

The Association's policy of exchanging technical papers with the foreign foundry groups was continued during 1931 for furtherance of international good will and the worldwide dissemination of foundry knowledge. Six foreign organizations — the Australian, British, Dutch, Italian, Belgian and French technical foundry associations—participated in this exchange during 1931, several of the foreign exchange papers being presented before the Chicago convention of the A. F. A.

Two committees of the Association were organized in 1931 to secure exhibits on cast metals, both production and products, for displaying permanently in the New York Museum of Science and Industry, and in the Rosenwald Museum of Science and Industry of Chicago.

The year 1932 is an unknown quantity for business at this time, but one major event for the foundry industry will be the holding of the 36th Annual Convention of the A. F. A. in Philadelphia during the week of May 2nd. Recent research developments in the foundry field will be emphasized at that meeting, at which time the industry will assemble to take advantage of every opportunity for improving plants and practices.

Gold Medal Awards

On recommendation of the Board of Awards, the board of directors of the American Foundrymen's association has approved the presentation of the W. H. MacFadden and John A. Penton Gold Medal Awards to Dr. H. W. Gillett, director of Battelle Memorial Institute, Columbus, Ohio, and L. W. Spring, chief chemist and metallurgist, Crane Company, Chicago, for their outstanding services to the foundry industry. These two medal awards will be presented at the 1932 convention.

American Electroplaters' Society

HEADQUARTERS, CARE OF H. A. GILBERTSON, 434 SOUTH WABASH AVENUE, CHICAGO, ILLINOIS

The year 1931 has been one of steady progress. There has been a remarkable response for our branches in organizing classes in Chemistry. Competent instructors have been secured and the results have been most gratifying. Plating room problems are fast disappearing since the plater is learning to analyze his own solutions. Adolph Hirsch of the Philadelphia Branch is chairman of the Educational Committee who has this work in charge.

Dr. William Blum and his assistant at the United States Bureau of Standards are carrying on Research in electroplating. It is proposed that their work be brought more prominently before the membership in the future by frequent articles for publication in the Monthly Review. Jacob Hay of Chicago Branch is chairman of the Research Committee. Walter Fraine of Dayton Branch has recently been appointed Secretary-Treasurer.

The Society has more than held its own during the economic crisis. The branch meetings are well attended. Many younger members are qualifying as speakers, which is a promising sign, and this is being encouraged by the supreme officers.

The Society's annual convention will be held in Philadelphia June 20 to 23, 1932. George Gehling, past president, is chairman of the Convention Committee, and needless to say this year's sessions will be the greatest in the organization's history. Many problems of far reaching effect will be brought up for action by the delegates at this meeting.

The Monthly Review, the Society's official organ is becoming increasingly popular; seventeen hundred copies are mailed to the membership monthly. Highly instructive articles are contributed by members of the various branches, dealing with problems always interesting to the electroplater, and are highly appreciated because of their helpfulness.

It is possible that next year a "year book" in connection with the Society's activities will be published, which will be sold to members manufacturers, and supply houses as a further means of increasing the organization's finances.

W. J. R. KENNEDY, Editor, The Monthly Review.

International Fellowship Club

HEADQUARTERS, CARE OF T. A. TRUMBOUR, METAL INDUSTRY, 116 JOHN STREET, NEW YORK CITY

The past year saw continued activity on the part of the International Fellowship Club, organization of plating and finishing equipment and supply men. As usual, the Club was fully represented at the annual convention of the American Electroplaters' Society, held at Rochester last July. A meeting of the club was held, where a variety of problems were discussed, and the affairs of the Club were given consideration. The following officers were elected:

Robert Leather, Lea Manufacturing Company, president; N. P. Hunter, Egyptian Lacquer Company, vice-president; Thomas A. Trumbour, THE METAL INDUSTRY, secretary-treasurer.

The convention week saw an important innovation in the Club's activities. A full evening of entertainment was provided for all the members and guests of the Electroplaters' Society at the convention. This included taxis to and from a fine hall, catered buffet supper, dancing, cards, prizes, fine music and all the necessary trimmings for a fine time. High appreciation of the Club's treat was expressed on all sides.

Since the last annual meeting of the Club there has been considerable correspondence and several meetings between the officers to formulate plans for future activities of the Club. Plans are again under way for an evening's entertainment during the national convention of the American Electroplaters' Society in Philadelphia this year. The International Fellowship Club is putting forth every effort to make this the high spot of the convention.

Institute of Metals Division

HEADQUARTERS, 29 WEST 39TH STREET, NEW YORK CITY

The Institute of Metals Division of the A. I. M. E. has had a very active and successful year. The annual meetings held during the third week of February in New York City were unusually well attended. The tenth annual Institute of Metals Division lecturer, Dr. Arne F. Westgren of Stockholm Sweden, gave a very interesting lecture on "X-ray Determination of Alloy Equilibrium Diagram," and while on his trip to this country, as the Institute of Metals annual lecturer, traveled rather extensively and delivered a series of lectures on metallurgical subjects at various universities and technical society meetings.

Two technical sessions were devoted to a symposium on The Working of Metals. At the annual dinner in February, Dr. G. W. Thompson, Chief Chemist of the National Lead Company gave a general non-technical and very interesting talk on the subject of Lead.

Throughout the year, the Non-Ferrous Data Sheet Committee of the Institute of Metals Division, under the able chairmanship of R. S. Archer, now with the A. O. Smith Corporation, continued its activities and prepared a considerable additional number of non-ferrous metal data sheets. These data sheets are supplied to members of the Institute of Metals Division in loose-leaf form for insertion in hand-book binders.

The Institute of Metals Division has been active in co-operation with the General Research Committee of the A. I. M. E. This activity has resulted in the appointment of a joint committee of the Iron and Steel and of the Institute of Metals divisions on the subject of Gases in Metals. Two sessions devoted to papers on this subject are scheduled for the February, 1932, meetings. Upon the general results, interest, and trends developed in these sessions will be based the activities of the joint committee for the future year or two. The joint committee as at present designated consists of Dr. P. D. Merica, S. Skowronski and Sam Tour representing the Institute of Metals Division, and Dr. F. M. Becket, Dr. C. M. Johnston and Dr. P. H. Brace representing the Iron and Steel Division.

The September, 1931, meetings were held during National Metals Week at Boston, Mass. The Science Lecture, a joint undertaking of the Iron and Steel and the Institute of Metals divisions, was inaugurated. The plan is to have a lecture each Fall on some science other than metallurgy. The first science lecturer under this plan was Dr. P. W. Bridgeman of Harvard University, who has gained much recognition for his very successful work on the subject of the Effect of High Pressures on the Properties of Materials. Joint meetings on Theoretical Metallurgy and on Metallurgical Education were well attended and elicited a considerable amount of discussion. At the technical sessions of the Division, many interesting papers were presented, and developed much interesting, worthwhile, and spirited discussion. Alan Kissock of the Climax Molybdenum Company gave a very interesting illustrated talk on Molybdenum at the joint Division dinner.

For the February 1932, meetings, there are planned the sessions referred to above on Gases in Metals, a session devoted to White Metals such as aluminum, tin, lead, etc., two sessions on Theoretical Metallurgy, a session on Copper and Brass Alloys, and the annual Institute of Metals Division Lecture. The annual lecturer for 1932 is Dr. P. D. Merica, assistant to the president of the International Nickel Company.

The Nominating Committee of the Division has reported and nominated for officers of the Division for the coming year Dr. C. H. Mathewson of Yale University for Chairman; Dr. T. S. Fuller and W. M. Scheuch for Vice-Chairman; E. M. Wise, E. H. Dix, Jr., and J. W. Scott for members of the Executive Committee for three years.

SAM TOUR, Chairman.

Personals

Frederic W. Willard

Frederic W. Willard, who was recently made Executive Vice-President of the Nassau Smelting and Refining Company, New York, has devoted most of his business years to the Western Electric Company. In the service of that organization, he has held some of the leading industrial posts in the country. When Western Electric acquired the Nassau company and commenced operation of its plant at Tottenville, Staten Island, a short time ago, it chose Mr. Willard to be active head of its new subsidiary.

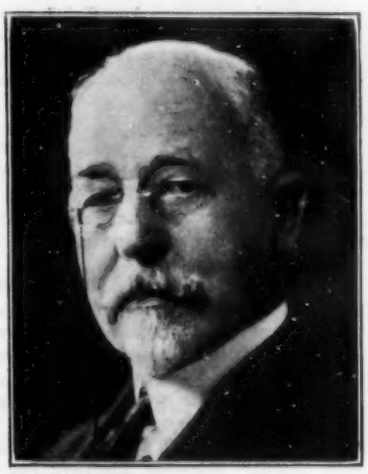
FREDERIC W. WILLARD

Mr. Willard earned his way through school working at jobs that varied from farm hand to freight inspector on the Pennsylvania Railroad. He graduated from the University of Michigan in 1906, and shortly afterward began his Western Electric career by becoming an analytical chemist at its Chicago shops. His progress was rapid, including promotions that took him to headquarters at New York and again to Chicago, where the great telephone works had by then been established.

For a year he was in charge of the instrument shops in Philadelphia, and later he directed the field forces in a large Eastern area. During a period of extensive growth he headed all chemical development work at the Chicago plant. Subsequently he was made Personnel Director, and in that capacity was for several years the Company's chief officer in the field of industrial relations. In 1929 he was appointed assistant manager of the works at Kearny, N. J. Earlier that year the University of Michigan conferred upon him the honorary degree of Master of Arts.

C. G. Backus

C. G. Backus, formerly manager of export sales for the Hanson-Van Winkle-Munning Company, Matawan, N. J., has established a consulting service on electroplating and polishing, with headquarters at 510 West 112th Street, New York City. Mr. Backus is widely known in the plating and finishing industry, and has always been immensely popular with the trade. He handled sales for A. P. Munning and Company before it combined with Hanson-Van Winkle Company to form the present Hanson-Van Winkle-Munning Company, and he continued with this firm until the latter part of 1931.



C. G. BACKUS

Charles H. Proctor

Charles H. Proctor, for almost twenty years electroplating specialist of The Roessler and Hasslacher Chemical Company, Inc., New York, retired from active service duty on December 31, 1931, to devote his time to special work for the company, chiefly to assist in training R and H salesmen and also to act as a consultant on plating problems. His retirement from active duty comes after more than forty years of association with the electroplating industry, during which time he made many important contributions to the development of the art both in this country and abroad.

CHARLES H. PROCTOR

In February, 1912, Mr. Proctor joined R and H and was instrumental in introducing "Trisalyts" (metallic triple salts, containing all the ingredients of the cyanide plating bath) to the plating industry. He also aided in developing metal cyanides for plating, and did much to advance this modern type of plating salt.

In 1922 Mr. Proctor helped organize the R and H Electroplating Laboratories, one of the first commercial plating laboratories to be operated by a chemical company for the purpose of helping platers to work out special problems, and to furnish reliable information on plating processes.

In addition to his regular company activities, Mr. Proctor was also an associate editor of THE METAL INDUSTRY in charge of electroplating and finishing for 22 years, relinquishing this position in 1929 because of the press of other work. Through the columns of this magazine he made an effective appeal to the foreman platers in the United States and Canada, which brought about their organization in 1909 into The National Electro-Platers' Society. In 1913, the name of this organization was changed to the American Electro-Platers' Society. This society became the principal factor in eliminating many of the "rule of thumb" methods in plating, and in raising the level of the plating industry to a more scientific basis, and has also been influential in bringing about many advances in plating during recent years. Mr. Proctor served as president of this society from 1909-12.

Harry J. Hosking is now on the staff of Foster D. Snell, Inc., Brooklyn, N. Y., having formerly been with Roessler and Hasslacher Chemical Company, Niagara Falls, N. Y.

T. C. Hoelzer has been appointed manager of foreign business for Hudson Smelting and Refining Company, Newark, N. J. He was formerly with Metal and Ore Corporation.

C. A. Anderson is now general manager, and **R. C. Blair** is now assistant sales manager, of Wright Manufacturing Company, Bridgeport, Conn. Their headquarters are at York, Pa.

L. W. Olson, factory manager, Ohio Brass Company, Mansfield, Ohio, recently directed a relief drive for the unemployed of that city.

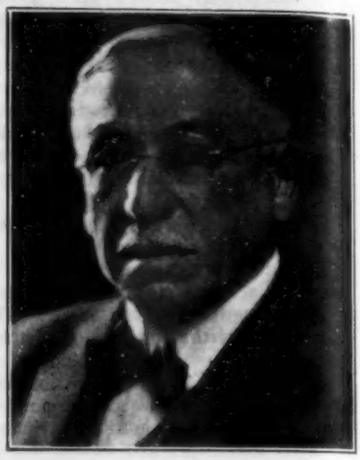
H. P. Rodgers, 528 Leader Building, Cleveland, Ohio, is now Cleveland Representative of the Duriron Company, Inc., Dayton, Ohio.

Wilfred S. ("Liquid Sulphur Mac") McKeon, president, Sulphur Products Company, is on a Southern trip, combining pleasure with business in the interest of his company, which manufactures oxidizing agents. He will be gone about four months, and will cover the larger part of the South.

R. L. Suhl, for the past three years assistant to the late Frederick S. Jordan, succeeds him as manager of the nickel sales department of The International Nickel Company, Inc., New York. **Ransom Cooper, Jr., Walter C. Kerrigan** and **Charles McKnight** have been appointed as Mr. Suhl's assistants. All four are veterans of the nickel industry.

Charles L. Allen

Charles L. Allen, president and general manager of the Norton Company, Worcester, Mass., grinding equipment and abrasives manufacturers, was tendered a dinner December 4, 1931, in honor of his completion of fifty years of leadership of his company. Besides telegrams of congratulation from President Herbert Hoover and former President Calvin Coolidge, Mr. Allen was recipient of an honor seldom conferred upon Americans of other than Swedish descent. He was made a Knight of the first class of the Order of Vasa by King Gustav V of Sweden. The distinction was for his great contribution to the development of friendly relations between Sweden and the United States, according to the Swedish consul general at New York, who represented the Swedish king at the dinner.



CHARLES L. ALLEN

Mr. Allen started his career with Frank B. Norton, in 1881, and aided the company's founder in pioneering the grinding wheel as a production tool. He has held numerous executive positions in the firm, and has been president since 1919.

W. Weir Henry of the Taunton-New Bedford division of Revere Copper and Brass, Inc., has been transferred to the Revere general sales department at 230 Park Avenue, New York.

W. C. Pinkerton has taken a position as industrial representative with Foster D. Snell, Inc., consulting chemists, Brooklyn, N. Y. He was previously with the International Exposition Company.

Fred N. Roe is now directly representing the Buffalo Bronze Die Cast Corporation, Buffalo, N. Y., manufacturers of "Durbar" bearing bronze. He formerly represented Waldo, Egbert, Maltby and Ward, Inc., Pittsburgh, Pa., in sale of the same product, and he continues to maintain headquarters at Pittsburgh.

H. S. Kimball has been elected vice-president and a director of the Illinois Zinc Company, and will make his headquarters at the company's offices at 52 Vanderbilt Avenue, New York City. Mr Kimball will devote his energies to development of the company's "Eraydo" alloys. He was formerly president of Remington Arms Company, and before that was president of the American Zinc, Lead and Smelting Company.

T. H. Wickenden has been appointed assistant manager of development and research of the International Nickel Company, Inc., New York. Since 1922 he has been in charge of the company's development work in automotive and aeronautical fields. **H. J. French** has been transferred to the company's development and research department to take charge of work in steel and iron. He was formerly a member of the research staff at the Bayonne, N. J., laboratory.

William H. Bassett, formerly of New Bedford, Mass., and metallurgical manager of the American Brass Company, Waterbury, Conn., has been appointed honorary secretary of the Massachusetts Institute of Technology to represent the institute in the Waterbury district. Mr. Bassett is a director and past president of the American Institute of Mining and Metallurgical Engineers, a member and former director of the Institute of Chemical Engineers, a fellow of the American Association for the Advancement of Science, a member of the advisory boards of the U. S. Bureau of Standards and the U. S. Army Ordnance Department, besides belonging to numerous American and British engineering, chemical and metallurgical societies.

Obituaries

Frederick S. Jordan

Frederick Samuel Jordan, for the past thirty years an outstanding figure in the nickel industry, died at his residence at 30 Fifth Avenue, New York, December 16, 1931, from cerebral hemorrhage. He was in his sixty-third year. He was sales manager of the nickel department of The International Nickel Company, Inc., New York.

FREDERICK S. JORDAN

Born in Berea, Ohio, on August 28, 1869, Mr. Jordan began his business career at the age of eighteen, when he became a secretary in the Cleveland office of the Big Four railroad. A year later he became private secretary to H. P. McIntosh, who was prominent in the Canadian Copper Company. When this company was merged into the organization of the original International Nickel Company in 1902, Mr. Jordan came to New York as sales executive, a position which he held during the progressive development of the International Nickel Company.

Benjamin H. Burdon

Benjamin H. Burdon, Sr., an executive of the United Wire and Supply Corporation, Providence, R. I., died December 8, 1931, after a long illness, at the age of 72 years. For many years he was associated in business with his father, the late Levi L. Burdon, inventor of seamless wire, and was one of the officials of the old Burdon Seamless Wire Company, which had been founded by him and his father; at the time it merged with the United Wire nad Supply Corporation.

W. H. M.

Harry C. Larter

Harry C. Larter, president of Larter and Sons, New York and Newark, N. J., manufacturing jewelers, died December 7, 1931, at his home in Newark. He was 61 years old, and had been suffering from the effects of a heart attack three weeks previous to his death.

Mr. Larter was very prominent in the trade, being referred to as "Mayor of Maiden Lane" at times. He was an officer of several trade organizations in the jewelry lines, and active in civic as well as business affairs.

Frank Williams

Frank Williams, owner of the Williams Brass Foundry and the Judson and Williams screen plate factory, Holyoke, Mass., died December 3, 1931, after two weeks' illness. He was fifty-nine.

Mr. Williams was born near Newark, N. J. He went to Holyoke forty years ago, and founded a firm with C. A. Judson, to manufacture screen plates. He also became a partner in Higgins and Company, brass founders, and took over that company about ten years ago when J. E. Higgins retired.

C. W. Curtiss

C. W. Curtiss, president and general manager, Waterbury Clock Company, Waterbury, Conn., died January 10, 1932. A complete obituary will appear in the next issue.

Charles W. S. Munro

Charles W. S. Munro, president of the Superior Zinc Corporation, Bristol, Pa., died November 9, 1931, at his home, 101 Tower Circle, Edgehill Gardens, Morrisville, Pa., aged 59 years. He had been afflicted with a heart ailment for the past year.

Born in Philadelphia and educated in that city's public schools, Mr. Munro went to Trenton, N. J., and organized the Trenton Smelting and Refining Company about 20 years ago. Later the company was sold, becoming the Federated Metals Corporation. Four years ago Mr. Munro organized the Bristol Zinc Company, becoming president and controlling shareholder. Some years ago he removed to California, where he lived for a time. He is said to have had considerable success in the smelting business.

C. A. L.

James A. Limerick

James Arthur Limerick, internationally known caster of bronze sculpture, died November 22, 1931, at his home in Baltimore, Md. He was 61 years old.

Born in Philadelphia, Pa., Mr. Limerick studied art here and abroad and early in his career attracted attention by his skill in casting sculpture. He did considerable work for Paul W. Bartlett, noted American sculptor, including the statues of Alexander Agassiz at Calumet, Mich., and Harvard University; the heroic statue of Robert Morris at the Philadelphia Custom House; an immense statue of Benjamin Franklin for the city of Waterbury, Conn.; the great statue of Chief Justice John Marshall for the Capitol grounds at Washington. Mr. Limerick operated his own foundry at Baltimore.

Morgan L. Schwarz

Morgan L. Schwarz, Minneapolis, Minn., jewelry manufacturer, died December 9, 1931, at his home in that city, after several months of illness. He was forty-five.

MORGAN L. SCHWARZ

Mr. Schwarz was a native of Minneapolis. He began his business career by working in his father's candy factory, which he left to become an errand boy in the Minneapolis jewelry firm of Kriess. This concern was later taken over by Bismark Schwarz, a brother of the deceased, and when his brother retired, Morgan Schwarz became sole owner. He was in the jewelry business 20 years.

George Edward Abbott

George Edward Abbott, president, Abbott Ball Company, Hartford, Conn., died January 1, 1932, aged 67. The news comes as we go to press and a complete obituary will appear in the next issue.

James D. Bell

James D. Bell, Fresno, Calif., jewelry manufacturer, died there December 18, 1931, in his fifty-sixth year. Mr. Bell operated a jewelry manufacturing and engraving plant for many years.

Industrial and Financial News

Instrument Firms Merge

The Pyrometer Division of the Wilson-Maeulen Company, Inc., has merged with The Foxboro Company, Foxboro, Mass. This action has followed twenty-five years of close and friendly cooperation between the two companies. Users of Wilson-Maeulen pyrometers will now be served by a larger, more widespread group of instrument engineers. Entire personnel of the Pyrometer Division of Wilson-Maeulen will be merged with that of The Foxboro Company.

Wilson-Maeulen Company specializes in electric indicating, recording and controlling pyrometers and electric resistance thermometers for temperatures up to 3600° F. Thus, The Foxboro Company will now offer a complete range of instruments of standardized quality.

The Rockwell hardness tester that has been manufactured by Wilson-Maeulen will hereafter be built and sold by the Wilson Mechanical Instrument Company, which succeeds the Mechanical Instrument Division of Wilson-Maeulen, and continues in the same factory and offices at 383 Concord Avenue, New York City.

Wilson-Maeulen pyrometers and controllers will be built at Foxboro. All communications relative to Foxboro and Wilson-Maeulen pyrometers should be addressed to Wilson-Maeulen Pyrometer Division, The Foxboro Company, Foxboro, Mass.

Brass Goods at British Fair

Products of an essentially British industry, centered in Birmingham, England, will be shown at the British Industries Fair, Castle Bromwich, Birmingham, from February 22 to March 4, 1932, in all their variations for cabinet work, plumbers' and engineers requirements, gas and electrical fittings and shop and public house fittings. In recent years there has been a large increase in the production of stamped brass goods and these, as well as cast goods, will be exhibited. The tendency of the English brassfounder, in days of keen foreign competition, is, of course, to concentrate on a less diverse range of products and reap the benefits of mass production, the announcement says.

Pattern Aluminum Price Cut

Boston agents for producers of pattern aluminum early last month reduced the price of this metal from 27.00c., to 24.50c., per pound, according to a press dispatch from that city. The metal is said to be gaining favor with foundries, especially those producing stove parts.

The Metal Industry's New Headquarters

THE METAL INDUSTRY's new New York City office is at the southeast corner of the 17th floor of the new 35-story building shown in the illustration, located at 116 John Street, corner of Pearl, and extending through to 1 Platt Street. The building is near the Seventh Avenue and Broadway subway. The outlook from the 17th floor commands a fine view of the

East River and its bridges, and of Upper New York Bay as far south as the Narrows. It also affords larger and better lighted quarters, and a better layout than any offices THE METAL INDUSTRY has had in the past.

The change to these quarters is the fourth since the establishment of THE METAL INDUSTRY in January 1903, when the journal was founded in a small room at 61 Beekman Street. In February 1910 the office was moved to 99 John Street, where it remained for nearly 22 years, the quarters being enlarged by changing to more desirable rooms. The building at 99 John Street is to be torn down on May 1, 1932.

Aided by the improved conditions in its better quarters, THE METAL INDUSTRY hopes to produce a journal larger, better and brighter than ever. Subscribers and advertisers are urged to visit the new offices.

Mr. Iselin and the Defender

The recent death of C. Oliver Iselin, yachtsman and banker of international fame, is a reminder of the early days of the aluminum industry. Mr. Iselin furnished most of the funds to build the yacht Defender, which successfully defended The America's Cup against Lord Dunraven's Valkyrie III. The top plates and deck beams of the Defender were made of aluminum in order to lighten the upper hull, and this application of what was then quite a new metal was heralded all over the world. Before and after the race, the late James C. McGuire wrote a series of articles for "The Aluminum World" (now incorporated with THE METAL INDUSTRY) on the use of the light metal in yacht and boat building. Another feature of the Defender was the variety of metals in her hull. Besides the aluminum top, sides and deck beams, her bottom was bronze and the structural frame steel.

During the international yacht race in 1930 between the Enterprise and Shamrock V, the American yacht featured an aluminum mast and boom, a bronze hull, and many Monel metal and other alloy fittings.

Weston Fellowship

Applicants for the Weston Fellowship in Electrochemistry ($1,000) for the university term 1932-33 are urged to mail their applications as early as possible. They must reach Secretary of the Electrochemical Society, Columbia University, New York City, on or before March 1, 1932.

The Fellowship is awarded without distinction on account of sex, citizenship, race or residence. Application blanks may be procured from the Secretary of the Society.

Corporation Reports

Doehler Die Casting Company omitted quarterly dividends on the $50 par 7 per cent cumulative preferred stock and on the no-par 7 per cent cumulative preferred stock, due at this time.

Canadian Bronze Company, has declared a quarterly dividend of 31¼ cents on the common stock, placing the issue on a $1.25 annual basis, against $2.50 previously, and the regular quarterly dividend of $1.75 on the preferred.

General Cable Corporation stockholders have approved a decrease in the stated capital represented by its Class A and common shares from $17,280,881 to $10,280,881, a reduction of $7,000,000. The change, which will not affect the actual value of the shares, was made so that the books of the company would not show a deficit as of Jan. 1, due to the decrease in the value of inventories and other developments caused by the general decline in business.

New Companies

Atlantic Smelting Works, Inc., 68 Hamilton Street, Cambridge, Mass., organized by L. D. Covich, David Simons and Morris Bean, has erected plant for smelting and refining white metals. Company is in market for used lead pipe extrusion press and scrap solders, babbitts and their residues.

United Aluminum Products, Inc., Dayton, Ohio, has been organized by United Aircraft Products, Inc., to manufacture bakery steel pans by a patented extrusion process. Production will be in United Aircraft plant, according to Joseph G. Lehman, treasurer. The product is a seamless steel pan, hand dipped in tin.

Franklin Die Casting

Franklin Die Casting Corporation, Syracuse, N. Y., founded over 25 years ago by H. H. Franklin, a pioneer in the industry, has been purchased by the Precision Casting Company, Inc., Fayetteville, N. Y. Purchaser will remove the equipment to its own works at Fayetteville and Cleveland, Ohio. Precision company is headed by F. P. Assman, A. G. Chase and J. W. Knapp.

Developments in Metals

COPPER is being salvaged in considerable quantity from the huge dome of the old Warner astronomical observatory at Rochester, N. Y.

CHROMIUM PLATE 0.0004 in. thick can be used effectively on interiors of big guns to prevent corrosion and abrasion, Dr. William Blum of Bureau of Standards recently told members of the Franklin Institute. Dies for striking coins are being plated with chromium.

ZINCED (galvanized) roofing exhibit of the American Zinc Institute has attracted considerable attention the past half year at fairs and other show places. Exhibit shows how the roofing is applicable to farms, homes, etc., in many ways. The Institute's "Seal of Quality" is explained.

DURALUMIN was used for constructing the world's lightest row boat. It weighs 30 pounds. The boat, 10 x 3 x 1 feet, is made in two sections for portability, one part nesting in the other when not in use. Cork seat provides emergency buoyancy.

—C. W. G.

BRASS slugs formerly used for slot machines in San Francisco, now outlawed by a new law, have been remelted and the reclaimed brass sold. —C. W. G.

ALUMINUM ALLOY of special type was used by C. M. Spencer, Denver inventor, for a new type of telescope which weighs 300 pounds as against 1,900 pounds weight of same instrument in conventional construction. Chief object of using aluminum was to eliminate vibration. The metal was nearly all cast.

News From Metal Industry Correspondents

New England States

Waterbury, Connecticut

JANUARY 2, 1932

In spite of rumors that the dividend would be slashed or eliminated entirely, the **Scovill Manufacturing Company** directors at their meeting last month declared the usual quarterly dividend of 50 cents a share, payable Jan. 1. This is the same rate that has been maintained for a year and one-half, although prior to that it was $1 per quarter. The amount of dividends distributed Jan. 1 was $442,500, and the total for the year was $1,770,000.

Waterbury Clock Company has received orders during the past month for 150,000 electric clocks, **President C. W. Curtiss** said, confirming a rumor, which also said that this amount was called for in one order. It was not one order, but several, the total aggregating about that figure, he said. As a result, the tool departments have been putting in much overtime. However, the plant closed down for the usual two weeks at Christmas to allow for inventory and repairs.

Most departments of the **American Brass Company** closed for a week and one-half at Christmas. Among the other factories, such as Scovill, Chase, etc., the shutdown varied from three days to two weeks.

Waterbury Farrel Foundry Company has received a large order for machines to manufacture ammunition. It is understood the order is from a foreign government.

President R. W. Reid of the **Beardsley and Wolcott Manufacturing Company** has been ill in the hospital for a number of weeks, but is now sufficiently improved to be moved to his home. However, it is reported that he will not resume his duties as head of the concern for some time. In the meantime, **Vice-President James R. Sheldon** is acting as general manager. Since the failure of the attempted merger of the concern with the **Connecticut Electric Manufacturing Company** of Bridgeport, the business has improved, and it is now said to be operating at a profit, as the result of considerable pruning of overhead and the receipt of a substantial amount of small orders.

Congressman E. W. Goss of this city has introduced a bill, which would have the War Department award so-called "educational" orders in times of peace to improve facilities for the production of army equipment in time of war. It would make available $2,000,000 a year for five years. If this passes, it is expected the greater portion of the contracts would go to metal plants in and around Waterbury. The idea of the bill is that in war time producers of war equipment take considerable time to get their plants in shape for the manufacture of war materials, and by placing certain orders in peace time it will keep the plants equipped for war time and give the employes necessary training.

Emerson Tompkins, Charles Doescher, Frank D. Hermans, Daniel Casey, John Robinson, Ottone Ciasullo, William Foley, Dennis Sullivan, William Carew and **Ralph M. Dawson** completed 25 years service with the **Scovill Manufacturing Company** last month. **Edward Meehan** completed 45 years service.

Patents were granted local inventors last month as follows: **Daniel F. Dalton,** fastening device, assigned to the Shoe Hardware Company; **Jeffrey Veillette,** quick retreat mechanism for feeding device, assigned to the Scovill Manufacturing Company; **Karl W. Hallden,** assigned to Steel and Tubes, Inc., Cleveland, apparatus for cutting moving articles; **Thomas S. Derr,** assigned to the Bristol Company, venting device; **Martin L. Martus, E. H. Becker** and **J. G. Ross,** primary battery. The Scovill Manufacturing Company was granted a trade mark for lawn sprinklers.

W. A. Purdy, controller of the Chase Companies, Inc., **S. B. Terry,** assistant treasurer of the American Brass Company, and **John V. Montague,** controller of the Scovill Manufacturing Company, audited the books of the Mutual Aid Unemployment Fund last month, and bestowed high praise on the way work and relief have been provided. Weekly donations of a percentage of salaries, the percentages varying according to the size of the salaries, from practically all in the city who are employed, and equal donations by the employers, have kept the fund functioning. During the year $667,207 has been received and $650,712 expanded, of which $592,015 was for work done and the rest for direct relief. An average of 1,700 men have been kept employed weekly throughout the period.—W. R. B.

Connecticut Notes

JANUARY 2, 1932

NEW BRITAIN — The **Stanley Works** is working on substantial hardware orders from Westinghouse and General Electric, according to authentic reports. **Ernest W. Christ,** vice-president, admitted the large orders, but would not mention the firms' names. As

to reports that a large order had been received from the Ford Motor Company, Mr. Christ said the company has done much work for it in the past, but would not say whether a 1932 order had been received. Stanley Works declared a quarterly dividend of 37½ cents a share, payable Jan. 2. The previous rate was 50 cents a share.

Landers, Frary and Clark directors declared quarterly dividend of $1 a share, payable Dec. 31. Other dividends declared and dates payable, are: **American Hardware Corporation,** $1, Jan. 1; **Hart and Cooley Manufacturing Company,** quarterly, $1.50, Jan. 1; **Fafnir Bearing Company,** quarterly, $1, Jan. 1; **North and Judd Manufacturing Company,** quarterly, 1½ per cent, Jan. 1.

G. E. Prentice Manufacturing Company declared an extra 2 per cent and regular 4 per cent dividend, payable December 15, bringing the company's 1931 payments up to 16 per cent. Large orders for zipper parts, constituting about 75 per cent of the firm's output, are responsible for its good position.

HARTFORD — Underwood Typewriter Company has arranged for manufacture of entire Underwood typewriters in Canada as a result of the new British tariff. They will be built by the **United Typewriter Company,** which heretofore merely distributed them.

Remington Typewriters, Ltd., Canadian subsidiary of the American company, is planning to double its Toronto plant.

Arrow, Hart and Hegeman declared quarterly dividend of $1.62½ preferred and 40 cents on common, payable Jan. 1. Previous dividend on common was 50 cents quarterly.

Plimpton Manufacturing Company declared special dividend of 3 per cent payable Dec. 21.

BRIDGEPORT—E. P. Bullard, president, **Bullard Company,** announces the appointment of the following vice-presidents: **L. F. Horner,** in charge of business promotion; **J. W. Bray** advanced from sales manager to vice-president in charge of sales; **D. B. Bullard** from mechanical engineer to vice-president in charge of the engineering department.

Habirshaw Wire and Cable Company will transfer production operations from this city to Yonkers, N. Y.

Whittlesey Manufacturing Company plant here has been acquired by the Bridgeport Chair Company.

Kron Company, recently incorporated in Connecticut and formerly the American Kron Scale Company of New York, has leased the Holbrook-Brewster plant here, and will move its production equipment from New York here. It has purchased an additional tract of 1¼ acres, with buildings, adjoining the factory. The company holds domestic and foreign patents for 140 products, including springless and automatic scales. Manufacturing here will start about Jan. 1.

Reduction in the price of sterling silver has resulted in increased activity at the **Handy and Harmon** refining plant here, where silver is refined for silverware manufacturers.

NEW HAVEN—Final steps in the acquisition of the **Winchester Repeating Arms Company** by the **Western Cartridge Company** were taken last month when it was sold under United States district court order for $4,000,000 to the reorganization commitee. The committee, in turn, sold it to Western Cartridge for $3,300,000 in cash and $4,800,000 in 6 per cent cumulative stock of the cartridge company. The plant now employs 2,500 persons.

TORRINGTON — Torrington Company declared a quarterly dividend of 75 cents a share, payable Jan. 2. The company has ust been allowed a refund of Federal taxes amounting to $154,396.

BRISTOL — Clayton Manufacturing Company is operating on full time in the manufacture of scissors.

Patrick J. Coleman, aged 79, who in his early years attempted to operate a copper mine here, and who opened up the abandoned copper mines in Cheshire, Conn., for a time, died here November 30.

WINSTED—Several employes of the case department of the **William L. Gilbert Clock Company** have been laid off temporarily. Up to the present time practically a full force has been employed on a full time basis.

Fitzgerald Manufacturing Company has gone on a 40-hour week basis instead of 55 hours as during the past several weeks. It laid off nearly 100 men last month.

NORWALK—Segal Lock and Hardware Company omitted dividend action at the directors' meeting held last month, believing it to be "for the best interest of stockholders to conserve the working capital position so that the company may provide for the profitable growth of the Segal safety razor division."

Independent Lock Company, Fitchburg, Mass. is negotiating for the plant, equipment and business of the **Lockwood Manufacturing Company** of this city. The prospective owners are desirous of having a plant nearer to the New York market. The Norwalk plant now employs about 200.

THOMASTON — Both the **Seth Thomas Clock Company** and the **Plume and Atwood Manufacturing Company** curtailed their schedules last month, due to slowness of orders. No employes were laid off.

STAMFORD — Yale and Towne Manufacturing Company declared dividend of 25 cents a share last month, payable Jan. 2. The previous rate was 50 cents quarterly.

TERRYVILLE—Eagle Lock Company is installing an oil heating system for the entire plant, to replace the former coal heating system.

MIDDLETOWN — D. H. Byerly, formerly in the sales department of small motors of the **Westinghouse Electric Company,** has been appointed merchandise manager of the **Russell Manufacturing Company** of this town. **W. T. Palmer,** formerly manager of the automotive replacement department of the local concern, has been promoted to managership of the automobile replacement and equipment departments combined.

MERIDEN—Manning Bowman Company is bringing out a line of French automatic drip coffee makers in finishes of silver, pewter, chromium and copper. Another new line consists of antique finished bronze console sets, vases and fruit dishes. W. R. B.

Providence, Rhode Island

JANUARY 2, 1932.

The year 1931 closed with industrial conditions about the worst the present generation has seen. And the new year apparently holds out no very promising improvement, at least not for the immediate future. Never in the history of Providence and surrounding municipalities and townships have there been so many persons out of employment, or so little prospect of work. During November and December there was a flurry of activity in the jewelry lines, but it was only of a seasonal nature. There is a somewhat healthier feeling among the jewelry interests that promises well for the coming spring. A slight improvement has also been noted in the small tool lines which furnish a fairly good barometer for the coming months.

Mays Manufacturing Company has been elected to membership in the **Metal Findings Manufacturers Association.**

After a quarter of a century at 156 South Main Street, the **Mason Manufacturing Company,** manufacturers of tin cans and other tin products, has removed to Dexter Road, East Providence. The building was formerly occupied by the Eastern Bolt and Nut Company. The company is also making stamped metal novelties. Much of the company's production goes to the chain stores. While the floor areas of the two places are practically equal, the new factory offers many facilities for the company's work which did not exist in the former plant. In the new location the number of employes has been increased about thirty per cent.

B. Novgrad & Co., Inc., has been incorporated here for the manufacture of jewelry. August Schaffner, Benjamin Novgrad and H. J. Aisenbeg are the incorporators.

Luigi Carbonette has registered in the City Clerk's office that he is the owner of the E. A. M. & Co., a new manufacturing jewelry concern at 104 Point Street.

Gertsacov Jewelry Co., and the **Improved Pencil Co.,** have removed from 158 Pine Street, Providence, to 581 Pawtucket Avenue, Pawtucket, where they are occupying their own building.

Rhode Island Tool Company, Providence, has filed a statement with the Secretary of State of a change in the capital stock from $450,000 to 4,500 no par common shares. W. H. M.

Western Massachusetts

JANUARY 2, 1932.

As compared with November, 26 metal working firms in this area showed a decrease in employment of 22 last month. Manufacturers expect further slight cuts in personnel until the middle of January.

From the middle of January until late spring indications point to great increases in output, as inquiries concerning products are coming in daily in great numbers at practically all of the plants located in this area, and tentative orders for the coming quarter are much larger in number than have been reported in this district in more than a year. Inventories have been decreased to the absolute minimum, and other factors combine to make the outlook for the first half of the year very bright.

Perkins Machine and Gear Company, Springfield, has perfected a new type of washing machine ringer which is said to be much more satisfactory than older designs on the market, and great sales for the new product are predicted.

Bosch Machine and Tool Company, Springfield, is running practically at capacity on orders for automobile tools, and no break appears likely in their activities for some time.

Plans for the "Sell Springfield" campaign are progressing rapidly, and with the recently acquired cooperation of Mayor Dwight R. Winter the program is moving rapidly. Present plans call for mailing lists of Springfield industries to all of the purchasing agents along the Atlantic seaboard.

G. B. Y.

Middle Atlantic States

Central New York

JANUARY 2, 1932.

Rome, center of the copper industry in this area, is marking time, according to reports from that city. Employment figures of the Industrial Association are not encouraging regarding the immediate Rome area. The association reports that plant executives in Utica who are members of the association report that the past year has seen the number employed in metal trades drop more than 13 per cent.

Two of the newest steamships of the Dollar Lines, the President Hoover and the President Coolidge, were equipped throughout with beds and springs manufactured by the **Rome Company, Inc.** The order kept 200 men working overtime for several weeks.

Camden Wire Company has resumed work in its new home, a former yarn mill. These quarters will be maintained until its recently fire-swept factory can be repaired or rebuilt.

General Cable Corporation stockholders were asked this month to consider a reduction in the stated value of Class A and common stock from $17,280,881, as at present, to $7,000,000, the change not to affect its actual value. The corporation claims this would result in earlier resumption of dividends out of future earnings on preferred and Class A stock, and possibly earlier dividends on common.

Last week Ambrose McNamara announced receipt of a decision by the United States Patent Office board of appeals affirming a decision of the examiner of interference awarding priority to invention of a ventura or con muffler to McNamara. The decision was on an appeal of Mr. Powell from the examiner's decision. In the $90,000 suit Mr. Powell has entered a general denial.

Irving L. Jones, president, **International Heater Company,** Utica, has been re-elected president of the **National Warm Air Heating Association** at its 19th annual convention in Washington.

Fire did damage estimated at about $1,000 to the **Union Fork and Hoe Company** in Frankfort, Dec. 2.

Robert Kent, vice president of **Divine Brothers Company,** polishing equipment makers, has been named a member of the New York Committee of the American Engineering Council in a movement to increase and stabilize employment.

George L. Brunner, Utica, secretary and treasurer of the **Brunner Manufacturing Company** was this month named president of the **Motor and Equipment Manufacturers Association,** in session at Atlantic City.

William C. and **Henry O. Steinhorst,** Utica, **Emil Steinhorst and Sons,** have received a patent jointly on a warm air furnace they invented three years ago.

The Brass and Copper Five is taking an active part in the bowling league in Rome.

Optimism regarding 1932 business was expressed by executive officials of the **Remington Arms Company** in conference at Ilion this month. Business of 1931 was reviewed and 1932 plans outlined.

George J. Fisher, a foreman at the **Utica Products Company,** dropped dead while on his way to work early this month.

Savage Arms Corporation, Utica Drop Forge and Tool Company, and **International Heater Company** are among the Utica firms co-operating in a series of health talks being given at noon to the employes by the Oneida County Medical Society, Utica Dental Society and the Y. M. C. A.

Glaser Smelting and Refining Company, 31 Wyckoff Avenue, Brooklyn, N. Y., manufacturing lead, babbitt, solder and similar white metal products, will, beginning January 1, 1932, operate under the style of **Glaser Lead Company,** the latter name being more descriptive of its business. Ownership, management and personnel remain the same. **Simon Glaser** is president; **Irving Glaser,** secretary and treasurer.

E. K. B.

Newark, New Jersey

JANUARY 2, 1932.

May Radio and Television Corporation, large distributor of radio receiving sets, which recently acquired for headquarters a building at Lafayette and Great Jones Streets, New York, will continue to maintain operations in Newark as heretofore. The company is now negotiating for a Newark site to which it will move shortly. The New York move was made simply to concentrate shipping and combine activities scattered throughout that city.

Edward King, treasurer, **American Metal Spinning and Welding Company,** 682 South Eleventh Street, has asked Vice-Chancellor Church to appoint a receiver for that concern. Insolvency was charged. Assets were listed as about $500, and liabilities in excess of that sum.

Dooner & Smith Chemical Company will erect 15,000 square feet of warehouse on Haynes Avenue. The building will be one-story high.

Following Newark concerns have been incorporated: **Spring Engineers,** $100,000, metal products; **Central Metal Mfg. Co.,** 3,000 shares common; **Curtis & Smith Mfg. Co.,** 200 shares no par, chemicals.

C. A. L.

Trenton, New Jersey

JANUARY 2, 1932.

Solfo Chemical Company, 821 Pennington Avenue, has just completed a large addition to its plant here to take care of increased growth of its business in chemical products for use on electric signs and metal products. The company is now seeking a patent on a liquid metallic paint which makes possible the use of paint, lacquer or enamel on the surface of galvanized metal.

Ajax Electrothermic Corporation, American Minerals Products, Bartley Crucible and Refractories Co., and John A. Roebling's Sons Company, were among the plants of Trenton to contribute sums of money to the unemployment committee of Trenton.

Following concerns have been incorporated here: **Perdue Radio Co.,** mfg. radio and electrical equipment; $50,000 preferred and 500 shares common; Montclair. **Monitrol Systems, Inc.;** $40,000 preferred; 5,000 shares common; mfg. radio controls: Asbury Park. **Hanco Chemical & Mfg. Corp.;** $125,000; Elizabeth. **Voltare Tubes, Inc.;** manufacture radio tubes; 2,500 shares no par; East Orange.

C. A. L.

Middle Western States

Detroit, Michigan

JANUARY 2, 1932.

One of the hardest years in the history of the non-ferrous metal industry (for the Detroit area, at least) has passed. But in spite of what has happened during the last twelve months, the New Year is being started with more or less enthusiasm. As might be expected, the keenest depression has been felt in the motor car industry, which leads everything in the Great Lakes industrial centers in the consumption of brass, copper, aluminum and other metals. With the new year comes a revival in motor car building, but it is not so spontaneous as in other years. Much of it is forced, and no one is sure it will extend over a lengthy period.

The plating industry should improve somewhat with the increased production among the accessory plants. Up to the present time, however, conditions in this line have been slow.

Little activity is noted in production of plumbers' and steamfitters' supplies. Manufacturing jewelers also are quiet.

With reconditioning and remodeling work in the new main plant still going on, the removal of the general offices of the **Detroit Brass and Malleable Works** to 100 South Campbell Avenue, Detroit, from the old location at 1177 Holden Avenue, has been completed. The new plant occupying two and one-half acres abutting the tracks of the Wabash, Pere Marquette and Pennsylvania railroads, was purchased last September from the General Brass Corp., because of its expansion possibilities, according to Frank L. Uhl, president and general manager. Enlarging of the factory proper is contemplated at some future date, but at present the old plant on Holden Avenue is to continue to be operated in conjunction with the new plant, he said. The concern manufactures plumbing and steam fittings and specialties for gas ranges.

Warren Aircraft Corporation stockholders have approved acquisition of **Aircraft Products Corporation** through an exchange of stock.

President Howard E. Blood says that for the eleventh consecutive month sales of the **Norge Corporation**, manufacturers of electric refrigerators have shown an increase over the corresponding month of 1930.

Sparks-Withington Company is preparing for manufacture of electric refrigerators at Jackson, Mich. Considerable machinery already has been installed in plant No. 4, at Michigan Center, which was designed and built originally for refrigerator making. The company hopes to be in production some time after Jan. 1.

Rex Products and Manufacturing Company, Detroit, makers of cleaning materials, has invented a new machine using a hot solvent process for cleaning of metals and alloys. It will be manufactured in Detroit and distributed by the Rex organization. The new method, known as the "S-M System," makes use of a special cleaning fluid known as "Perm-A-Clor," which is non-explosive and non-inflammable, it is reported.

McCord Radiator and Manufacturing Company, announces that it has completed plans for manufacture and marketing of the McCord unit heater, which will be offered immediately. This is a third addition to the McCord products this year. The company's principal products are automobile radiators, gaskets, electric refrigerator evaporators and condensers.

Electromaster, Inc., Detroit, has experienced some seasonal improvements in its business within the last few months, it is announced. It manufactures electric ranges. F. J. H.

Cleveland, Ohio

JANUARY 2, 1932.

Like the other industrial centers along the Great Lakes, this area is beginning to feel the effects of returning industrial activity, especially non-ferrous metals. This, of course, is due to demand from the motor plants, which are striving to get into substantial production again. Nothing is coming with a rush, however, and everywhere there seems to be a spirit of caution. The fact is, no one is able to forecast with any feeling of certainty just what is going to happen during coming months.

Nevertheless, everyone is welcoming the new year with hopes for better things than were the rule during the year just closed.

Electric Vacuum Cleaner Company, Cleveland, Ohio, has arranged with its Canadian subsidiary, **Premier Vacuum Cleaner Company**, Toronto, for that plant to manufacture at the rate of 1,000 machines a month for export, it is announced.

While in Cleveland recently, **Harry D. Harper**, vice-president of Willys-Overland Company, Toledo, declared that the automobile industry will do 20 per cent more business in 1932 than it did in 1931. F. J. H.

Toledo, Ohio

JANUARY 2, 1932.

Manufacturers in all parts of this area have put in a strenuous year trying to keep out of the red. Not many have succeeded, but with the passing of the old year things apparently are brightening. Four bank failures last summer almost took the heart out of the financial structure, and while large sums of much needed capital still are tied up, hope is expressed for the future.

Manufacturers in the non-ferrous metal lines, and platers, have pulled themselves together and are looking ahead for better things during the coming months. The accessory plants are gradually going into production again; moderately, of course, but it stimulates confidence in the future. Other lines also are beginning to show interest in the future, and the new year, for this area at least, has considerable promise.

Chevrolet Motor Company's plant in Toledo now has 2,000 workers on a schedule of two shifts of eight hours each, six days a week, the largest number in the factory's history.

Approximately 1,000 workers of the **Willys-Overland Company** were made happy December 21, by a 10 per cent wage increase. This favor was granted to those receiving less than $100 a month. Willys-Overland recently reported the largest deliveries in a single day in two years. F. J. H.

Wisconsin Notes

JANUARY 2, 1932.

Badger Wire and Iron Works has purchased the asssets of the **Wisconsin Art Bronze and Iron Company**, Milwaukee, according to **Albert Haeger**, president of the former concern. **W. C. Schmeling**, formerly president of Wisconsin Art, has been made general manager of Badger; **A. R. Stark** is office manager, and **Fred Van Kooy** chief draftsman. Some years ago they were associated with the **Wisconsin Ornamental Iron and Bronze Company**, which is now the Milwaukee plant of the **General Bronze Corp.** Business, according to Mr. Haeger, is running along at fairly satisfactory levels. Two of the more important jobs on which the firm is now working are the forest products laboratory, federal building at Madison, and the Harrison county courthouse in Virginia.

Incorporation papers for the new **Metalware Corporation**, which is organized by Manitowoc capital and has taken over the business of the **Two Rivers Metalware Corporation**, have been filed at Madison. The new concern is capitalized at $250,000. Stockholders include **Elmer Drumm**, formerly with the **Aluminum Goods Company; Elmer Bleser**; and **Charles O. Drumm. Remus Koenig**, head of the Metalware, will remain with the new owners in an advisory capacity. The plant will be continued at Two Rivers and extensions will be made to property and to the line of manufacture. The concern has achieved national recognition in the toy and electrical appliance field, and has built up a considerable export business.

Dr. P. V. Faragher, of the **Aluminum Company of America**, addressed members of the Milwaukee Association of Purchasing Agents, December 8, on "The Manufacture and Fabrication of Aluminum and Its Alloys and Their Application." A. P. N.

Pacific Coast

Los Angeles, California

JANUARY 2, 1932.

The non-ferrous metal lines in this territory have done fairly well the past year. A number of new firms have entered the field. There has also been good activity in the electroplating line, their business corresponding in some measure with that of the metal working concerns producing articles which require plating. Chromium plating has been in active demand. The jewelry and precious metal lines in general have not been so busy, but there has been a steady business in silver hollow ware.

National Brass Foundry, Los Angeles, is specializing in refrigerator parts.

Art Plating Works, 416 East 8th Street, reports good business. The firm is headed by **J. F. Gallon,** formerly with Gorham Company, and **J. Sambursky,** formerly with the Shreve Company.

Harry Drasner, job plater, is in a new location at 1900 Beverly Boulevard.

General Plating Company, 1423 South Hill Street, is a new firm here.

Los Angeles Band Instrument Company, 631 West 9th Street, reports continued poor business, which is attributed partly to radio.

Dodge, Inc., 9th and Flower Streets, is doing a good business in Britannia metal cups, vases, placques, trophies, etc. The firm was recently set up by a Chicagoan named Dodge, who has installed a very good plant where the products are cast, spun, plated and otherwise worked. Slush molding is done on the premises. A second plant is being started to take over some of the work. This is the only maker of such products in the Far West, it is reported; good shipments are being made to the east also. The firm intends to produce jewelry also.

Lacer Corporation, 1224 East 8th Street, has succeeded the **Lacer-Hallett Corporation,** producers of brass, aluminum and iron castings. Another plant is maintained at Inglewood, Calif.

Liquilox Company, 7576 Subway Terminal, is building a plant for manufacture of a liquid for protecting metals from acids, alkalies and corrosion in general. La Verne P. Jones heads the plant at 5501 East Slauson Avenue.

Stauffer Chemical Company, Rives-Strong Building, is putting up a new plant for manufacture of industrial chemicals. It will be in the Dominguez district, covering 100 x 160 feet, and will cost about $70,000.

Gilfillan Brothers, Venice Boulevard, radio manufacturers, will produce electric refrigerators here on a large scale. **O. A. Brandel,** formerly chief engineer for the Norge Company, Detroit, has been engaged as engineer.

National Dishwasher Company has started manufacture of a domestic dishwashing device. It is of aluminum and operates by faucet water pressure.

F. L. Maytag, Newton, Iowa, washing machine manufacturer, was here recently to look after his Coast business, which is large. The Coast business of Maytag Company will now be managed by **Will L. Hahn** and **John M. Wyman. T. A. Moler,** formerly here, has gone to Portland, Ore., to manage the branch there.

Ideal Steel Drawer Slide Corporation, 757 West Venice Boulevard, has begun operations and intends producing 40,000 sets of slides daily, with 15 men employed. A national advertising campaign is contemplated. **C. L. Wilquin** and **J. P. Thompson** head the firm. Various finishes will be put on the product.

Albatross Steel Furniture Company, West Los Angeles, **E. S. Gillette,** president, plans plant enlargement to cost $65,000, with additions especially to enamelling, plating and assembly departments. The firm makes hospital and office equipment, refrigerator cabinets, etc.

Booth Engineering Company, 3117 San Fernando Road, **W. K. Booth,** president, is adding 15,000 square feet to its plant. Company is putting on the market a new ice vending machine and other metal products.

Artistic Sign Company, 545 North Western Avenue, is a new concern which will manufacture a new type of illuminated brass sign. **H. S. Greenstone** is owner.

Simmons Company, Kenosha, Wis., bed manufacturers, will open a plant at 3631 Union Pacific Avenue, to make box springs. **N. T. Gilroy** will be manager.

Calwis Industries, First National Bank Building, Beverly Hills, has begun manufacture of toy boats, using considerable brass, aluminum, bronze, etc.

Monarch Dry Cell Battery Company, 1124 Santa Fe Avenue, is a new firm. **Don F. Osborn** is general manager. Company makes dry cells, flashlights, time clocks, burglar alarms, etc.

H. S.

Other Countries

Birmingham, England

DECEMBER 19, 1931.

Birmingham Aluminum Castings (1903) Co., Ltd., reports for the last financial year a balance at profit and loss of £15,487, and £24,394 was brought forward, making available £39,882. The report states that trade conditions during the period under review have been very depressed and business exceedingly difficult, and in the circumstances the directors feel the results may be considered very satisfactory. The plant and equipment have been adequately maintained and the company is in a most favorable position to take full advantage of any improvement in trade conditions.

Silversmiths have been busy in recent weeks on seasonal goods. The buying movement started very slowly, and some manufacturers have found their resources taxed to fulfill demand in the short time available for the delivery of orders. Silver has advanced in price, and the view is held that the day of very cheap silver is nearly over, and that when stocks are exhausted a higher range of selling prices will follow. For a long time past silversmiths have considered that the English hall mark has been unfairly used to disguise imported foreign wares. There is a difference between the marks applied to English and to foreign goods which are submitted to the Assay authorities. It is urged, however, that the distinction is not understood, and the claim that foreign wares should be distinguished with the name of the country of origin under the Merchandise Marks Act is being strongly pressed.

Makers of fireplace accessories are fairly busy, and in those departments producing oxy-copper and oxy-silver finishes there is a good demand. Stainless steel has not been taken up as readily as was expected owing to the excessive cost. A number of new designs in pewter were produced for the Christmas trade including a wide range of inexpensive goods. One leading firm has made a special line of pewter ware which is lighter in weight than their standard quality but is produced on the same quality of metal and is equally attractive in design. The purchaser, however, is able to obtain it at an appreciably lower figure. Aluminum was popular for Christmas gifts and those firms which encouraged the trade by supplying standard lines packed in attractive boxes ready for presentation booked plenty of orders.

Values of non-ferrous metals fell at the end of November, owing to the breakdown of negotiations in America. But in the early days of December there was a rally in raw copper prices, with the result that advances were declared in copper sheets, copper strip, brass tubes and copper tubes. The brass founders have been busier since the change of government, and the outlook is regarded hopefully.

Interest has been centered on the government's Abnormal Importations Order, and various industries are putting forward a strong case for protection. Among them is the jewelry trade, which considers it has a clear case. It is stated that cheap jewelry has for some time flooded the market, much of it coming from France, Germany and Holland. E. A. Dodd, chairman of the National Jewelers' Association, commenting on the situation the other day, said that certain designs of cheaper jewelry could not be manufactured in this country, and foreign competition made it impracticable to set up the plant.

J. A. H.

Business Items--Verified

United Engineering and Foundry Company, Pittsburgh, Pa., reports installation of a continuous hot copper rod mill for a large copper rod and wire producer in Canada. This company is installing rolling machinery for the **Dow Chemical Company,** Midland, Mich., to be used for rolling "Dowmetal."

Yale and Towne Manufacturing Company, Stamford, Conn., has concentrated all of its materials handling equipment production at its Philadelphia, Pa., plant.

Belden Manufacturing Company, Chicago, Ill., wire cable and cord manufacturers, have an employees group insurance plan totaling about $800,000.

Evans Plating Works is the new name of the job plating plant formerly known as the **Diamond Plating Works,** 22 North Cheyenne Avenue, Tulsa, Okla. This plant has been taken over by **L. J. Evans,** who operated it from 1923 to 1929, leaving it to start a plant at Oklahoma City, where he remained for two years. The firm operates general plating, polishing, lacquering and finishing departments.

Rocky Mountain Plating Works, Pueblo, Colo., plant expansion which will include provision for cadmium plating. **William Raschke** heads the plant.

Michigan City Foundry and Machine Company, Michigan City, Ind., has won a reduction in personal property assessment by the state tax commission, as a result of a protest which the firm made in conjunction with two others, **Hoosier Factories, Inc.,** and **Royal Metal Manufacturing Corporation.**

Fischer Foundry Corporation, Bound Brook, N. J., has acquired the business of the **Fischer-Sweeney Bronze and Aluminum Company, Inc.,** also of Bound Brook. The two plants will be consolidated at the purchasing concern's properties.

Andrew Harris is establishing a general electroplating and polishing shop at Parkesburg, Pa. Mr. Harris states that he has been employed as plater and polisher with various concerns for some years and will offer a complete plating and polishing service at his shop in Parkesburg.

Moore Enameling and Manufacturturing Company, West Lafayette, Ohio, has completed a one-story factory addition, to be used for the manufacture of enameled kitchen utensils and will double capacity. Estimated cost, $100,000.

Middletown Silver Company, Middletown, Conn., is operating at capacity with full working force, 12 hours per day. This firm operates the following departments: casting shop, rolling mill, spinning, stamping, soldering, plating, polishing, lacquering.

Hastings and Schoen Company and the **Hampden Brass Company,** both located at 262 Liberty Street, Springfield, Mass., have enjoyed good business throughout the past year. The following departments are operated: brass, bronze and aluminum foundry.

Keystone Chromium Corporation, Buffalo, N. Y., has taken over the business of the **Ebenezer Electric Plating Works,** Ebenezer, N. Y., and is merging the two enterprises in its own plant in Niagara Street, Buffalo. **George Witzleben,** former president of the Ebenezer company, enters the Keystone organization in an executive capacity. The Keystone company has orders on hand which will keep them working day and night for some time to come.

Federated Metals Corporation, Newark, N. J., has appointed **Samuel Frankel** director of sales of special alloys, with headquarters at the Newark plant. Mr. Frankel was formerly chief metallurgist and director of sales of **Niagara Falls Melting and Refining Company,** Buffalo.

United States Aluminum Company, Logan's Ferry, Pa., recently sustained damage by fire which broke out in the grease storage room in the bronze powder plant. The damage was estimated at $1,000.

Parker Metal Company, Baltimore, Md., recently sustained slight damage from a basement fire in its auxiliary plant at Paca and Gross Streets. Manufacturing operations were unaffected.

Bay State Abrasive Products Company, Westboro, Mass., has completed the new additions to its plant. This completes the new factory started in 1929. The entire plant is used for manufacturing grinding wheels, etc.

Mueller Brass Company, Port Huron, Mich., reports an increase of 296 per cent in its sales of streamline copper pipe and fittings for the fiscal year ending November 28, 1931, as compared with the preceding year. Sales totaled $448,555.32 in the past year despite decreased building.

C. Cowles and Company, New Haven, Conn., announces that it has not discontinued its foundry; merely closing it temporarily due to general business conditions. The company states that it is quite possible that the foundry will be re-opened in a short time. The following departments are operated: brass foundry, spinning, stamping, soldering, plating, polishing, lacquering, and japanning.

Schulte Grinding and Polishing Machine Company, Inc., formerly **Metal Finishers Company,** manufacturers of sheet and strip grinding machines, has moved its headquarters from 1958 West 45th Street, Cleveland, Ohio, to larger quarters at 6400 Breakwater Avenue N. W., where the machines are built.

The Arco Company, manufacturers of paints, varnishes, enamels, and lacquers, with general offices at Cleveland, Ohio, and plants in Cleveland, Los Angeles, and Toronto, announces the appointment of Philip L. Maury as president, S. D. Wise, president and S. D. Weil, vice-president, retiring.

The Wrought Metal Business

By J. J. WHITEHEAD

President of the Whitehead Metal Products Company of New York, Inc.

JANUARY 2, 1932.

The submitted resignation of the Phelps Dodge Corporation from Copper Exporters, Inc., was withdrawn almost simultaneously with the announcement that the copper producers both here and abroad had reached an agreement as to curtailment of production. For the time being it looks as if the industry had surmounted the last obstacle and that from now on the stocks of copper should not continue to increase but rather hold their own or slowly decline. In the event of a business revival, no matter how slight, appreciable quantities of copper are going to be needed. Depending on the extent of business recovery and "when," it is reasonable to expect that as the months go by the copper situation will improve.

At the present time the industry is not only in the midst of the general poor business situation but is experiencing its seasonal lull.

It still looks as if business in general was bounding along on the bottom. It certainly is not getting any worse, and there is every reason to believe that by spring it may be quite a little better. From a building survey just released by the Copper and Brass Research Association it is noted that building in 1932 is expected to exceed that of 1931 by some $500,000,000, and should total about $3,400,000,000. If this prediction is correct, it looks as if 1932 might be almost a normal building year. Another bright spot is that the stocks of fabricated products in hands of dealers and manufacturers are at a minimum, as they have been for some time. Perhaps if we are going to experience some sort of a recovery this spring it might not be out of place to replenish somewhat our stocks of materials if they are depleted, or to increase our normal stocks at the present time so as to take advantage of the existing price levels.

The nickel and Monel business in December about held its own as compared to November. Aluminum, too, is in fairly good demand, considering the general business situation. The demand for all metals and metal products has now about reached what might be considered a general level in view of the business situation. Whether the situation improves or gets worse, the demand for metals will follow.

The development departments of the various metal industries are all working to create new uses and build new markets. When the general situation gets better the effect of these efforts should be noticeable. In the meantime, it would seem that the present is no time to sit still but rather to get ready for 1932 and hope for the best.

Metal Market Review

By R. J. HOUSTON

D. Houston and Company, Metal Brokers, New York

Copper

JANUARY 2, 1932.

The events of 1931 have been of momentous consequence to the copper industry. It has gone through a year of decreasing consumption, oversupply and drastic declines in prices. These factors operated as a continuous handicap to the development of those favorable and healthy conditions necessary to impressive growth and prosperity. Trade in the metal dropped off greatly, and world-wide business reaction and depression were episodes spelling acute derangement in copper and allied lines.

The 1931 opening was on the electrolytic basis of 10½ cents a pound delivered to Connecticut Valley points. This was the highest price of the year. Initial quotations, however, were not long maintained and before January closed sales were made at 9¾ cents. Further concessions were made early in the year and the market drifted to 9½ cents. There was a brief rally to 10½ cents, but this gain was short-lived.

Market movements during the first and second quarters of the year just closed were subjected to influences which made for still lower prices. Considerable irregularity developed, but despite that fact sales during this period were in large volume especially for export shipment. Demand was not potent enough to overcome the downward trend, and by the middle of June the domestic price had been forced down to 8 cents.

In the last half of 1931 new low prices were established. Foremost as a depressing factor was the revelation of repeated increases to surplus supplies in primary hands. Official statistics showed the largest accumulation of surplus copper on record. On October 1, 1931, refined stocks in the hands of North and South American producers amounted to 479,896 short tons. Since that date publication of the copper statistics in this country have been discontinued, but the impression is that there was a further gain in stocks during October and November. In November the market sold down to 6¼ cents delivered Connecticut. This is the low point for all time. Firmer conditions developed in the last half of December on the important news that producers controlling over 90% of copper production of the world had agreed to a voluntary curtailment of output which would reduce production to between 60,000 and 61,000 short tons a month by participating companies. It is believed that this plan will reduce world output, including that of non-participating companies, to somewhere between 75,000 and 80,000 short tons a month, as against 120,689 tons in September. After this announcement the market advanced to 7 cents and later to 7¼ for domestic account with active buying here and for export at 7½ cents c.i.f. European ports.

Zinc

There was a good volume of business in zinc during 1931, but as far as price is concerned there was a recession in market value at the year-end of about one cent per pound from the high point. The market moved in a comparatively narrow range, the variations covering exactly a cent a pound, trading being carried on between 3⅛c. and 4⅛c. East St. Louis basis. Prices at the close for Prime Western slab zinc for shipment over the first quarter of 1932 were quoted at 3.15c. East St. Louis and 3.50c. New York, with indications that 3⅛c. in Middle West might be accepted.

The domestic statistical position showed stocks in smelters' hands December 1, 1931, of 130,865 short tons. This is about the average quantity carried in stock since July 31, 1931, and a decrease of 12,753 tons since January 1, 1931. Production and deliveries were in closer balance during recent months. This fact and a substantial increase in unfilled orders lately were encouraging features in the situation. Current prices of Prime Western are the lowest during the twentieth century. World stocks of zinc on December 1 were estimated at 307,250 metric tons. Indications are that production is being kept rigidly within current demands, and with any pronounced improvement in consumptive requirements the trend of the market should also improve.

Tin

Although market values for tin in 1931 declined in the closing month of the year to a low of 20.60 cents for prompt Straits, the lowest price in the twentieth century, the fluctuations were less violent than at anytime in the last 20 years. Price variations during the past year were only 6.90 cents per pound, and the close was only 5⅝ cents below the high for the year. The difference between the high and low price in 1930 was 16¼ cents per pound. Prompt Straits tin is now selling for less than one-half the average price during the six years ended December 31, 1929.

A situation like the present has, therefore, led producers to place themselves in a position to control production for the welfare of the industry at large. This has been done by the International Tin Pool. It is said that the pool now holds 19,000 tons of tin metal, and this pool has taken off the market tin valued at nearly £3,000,000. As a result of control deliveries for the three months ended November 30, 1931, exceeded supplies, even despite the heavy fall in American deliveries. The pool holdings remain among the visible supplies and are only to be released at the rate of 5% when the minimum selling price reaches £165 per ton, and 10% will be released at the next limit of £176. World's visible supply of tin on December 1 was 50,583 tons, an increase of 8,085 tons since January 1, 1931.

Lead

For the first time in the last 23 years the price of pig lead in the fourth quarter of 1931 touched the low point of 3.52½ cents East St. Louis delivery. There were 27 price changes during the past year, most of them downward, incidental to heavy stocks and unfavorable general conditions. At the start of the year the New York basis was 5 cents per pound but by the end of April a full cent had been clipped off the price. At the close of 1931 market quotations were on the basis of 3.75c. New York, and 3.55c. East St. Louis.

At frequent periods during the year there was active buying of large proportions. Production, however, was greater than consumption could absorb. Stocks of refined increased on November 30 to a new high total of 144,057 tons. Output was cut down in November, but it overtopped shipments for that month and left the statistical position unimproved. Domestic production is being curtailed and if this constructive feature is rigorously adhered to an era of better times for lead may be realized in 1932.

Aluminum

Conditions in aluminum have been such as to promote the maintenance of sales at the same conspicuously steady basis month after month during the entire year 1931. These remarks apply to the virgin ingot grades. Varying quotations were made on secondary and remelt aluminum, although even this material is more consistently steady than for numerous other commodities. Consumption is below normal, but at a fair rate considering reduced activity for automotive transportation and other consuming industries. Heavy exports from Canada have been a regular feature in years past. For the first ten months of 1931 they totaled 19,135,200 pounds. There was a pronounced pickup in the shipments abroad during October when the figures for that month rose to 9,789,100 pounds, exceeding by 443,000 pounds the entire amount exported in the preceding nine months. The bulk of the exports went to Great Britain, and were understood to be in anticipation of a tariff to be fixed on imports into that country which might include aluminum. More aluminum is going into commercial shapes where lightness and strength are requisites. Aluminum truck bodies, railroad tank cars for the transportation of gasoline and milk and heavy hopper cars are coming into vogue. Development of new uses for aluminum is being pushed with marked success.

Antimony

Trading in antimony was on a restricted scale in recent months. Prices of Chinese regulus went off from the January high of 7½c. to 6.15c. at close of year deliverable at New York duty paid. Tone of market was slack much of the time in a dull and featureless situation. Interest of traders was also hard to arouse owing to the absence of profitable trading opportunities. There was some prompt metal pressing on the market by outside holders, but reports indicate sales are slow even at concessions. Stocks of antimony in bonded warehouses on Nov. 1 were reported at 654,959 pounds, as against 1,972,603 pounds on April 1, 1931. Imports of antimony ore from Mexico have arrived in considerable volume for smelter treatment at the Texas antimony plant.

Platinum

The market course for refined platinum fluctuated widely during the year just closed. In April the price was down to $23 per ounce, but early in June the market moved forward and there was a sharp advance from $27.50 to $40 per ounce. During the last half of the year the tone has been steady at $40, although cash transactions were reported at several dollars less.

Silver

Silver has gone through a year of low market valuations and frequent fluctuations. World interest in the white metal has been intensified as never before. Producers, banking and financial interests, economic experts and debtor nations believe that a proper settlement of the silver problem would contribute immensely to a revival of industry and trade. There is urgent need for some sound solution of a subject of such international importance. Recent speculative activity lost much of the fervor and enthusiasm so noticeable a few weeks ago. Prices have moved within narrow limits lately, and China and India were only moderately active. Price of silver in bullion form is now 30⅛ cents per ounce, as against a high for 1931 of 37¼ cents on November 10. The low quotation during the past year was 25¾ cents on February 16.

Quicksilver

Quicksilver developed weakness and prices turned sharply downward during the year 1931. Recent trading was mostly for small lots, with quotations of $65 to $66 per flask. Wholesale quantities were available at $65 per flask. Foreign stocks are said to be heavy and sufficient to supply the world for several years at present rate of consumption.

Old Metals

Wide price variations for the different grades of old metals were recorded in 1931. The best showing was made early in the year, but depressing conditions in new metals soon extended to secondary material. Dealers and exporters kept a close eye on all movements and developments affecting values. The old metal trade had practically the same experience as almost all other basic lines of business during the last year. Despite much uncertainty and market unsettlement, the total turnover in the old metal branch of business was in large volume. Downward revision of prices has gone about as far as it can go, and with the turn of the year there are expectations of gradual improvement in demand and prices.

Daily Metal Prices for the Month of December, 1931

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	1	2	3	4	7	8	9	10	11	14	15	16	17
Copper c/lb. Duty Free													
Lake (Del.)	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875	6.875	7.00	7.375
Electrolytic (f.a.s. N. Y.)	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	7.25
Casting (f.o.b. ref.)	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.50	7.00
Zinc (f.o.b. St. L.) c/lb. Duty 1¼c/lb.													
Prime Western	3.125	3.125	3.125	3.15	3.175	3.175	3.175	3.175	3.15	3.15	3.15	3.15	3.15
Brass Special	3.225	3.225	3.225	3.25	3.275	3.275	3.275	3.275	3.25	3.25	3.25	3.25	3.25
Tin (f.o.b. N. Y.) c/lb. Duty Free													
Straits	21.00	21.25	21.00	20.875	20.60	20.65	20.60	20.70	20.80	21.60	21.60	21.70	21.60
Pig 99%	20.50	20.65	20.50	20.375	20.125	20.125	20.125	20.125	20.25	21.10	21.10	21.20	21.125
Lead (f.o.b. St. L.) c/lb. Duty 2½c/lb.	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.55	3.55	3.55	3.55
Aluminum c/lb. Duty 4c/lb	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3c/lb.													
Ingot	35	35	35	35	35	35	35	35	35	35	35	35	35
Shot	36	36	36	36	36	36	36	36	36	36	36	36	36
Electrolytic	35	35	35	35	35	35	35	35	35	35	35	35	35
Antimony (J. & Ch.) c/lb. Duty 2c/lb	6.50	6.50	6.30	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Silver c/oz. Troy Duty Free	28.50	28.75	28.75	28.75	30.00	29 625	29.125	29.625	30.125	30.625	31.25	31.625	31.625
Platinum $/oz. Troy Duty Free	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50

	18	21	22	23	24	25*	28	29	30	31	High	Low	Aver.
Copper c/lb. Duty Free													
Lake (Del.)	7.375	7.375	7.375	7 375	7.375	.....	7.375	7.375	7.375	7.375	7.375	6.875	7.108
Electrolytic (f.a.s. N. Y.)	7.25	7.25	7.25	7.25	7.25	.....	7.25	7.25	7.25	7.25	7.25	6 75	6.977
Casting (f.o.b. ref.)	7.00	7.00	7 00	6.875	6.875	.....	6.875	6 875	6.875	6.875	7.00	6.25	6.568
Zinc (f.o.b. St. L.) c/lb. Duty 1¼c/lb.													
Prime Western	3.15	3.15	3.15	3.15	3.15	.....	3.15	3.15	3.15	3.125	3.175	3.125	3.15
Brass Special	3.25	3.25	3.25	3.25	3.25	.....	3.25	3.25	3.25	3.225	3.275	3.225	3.25
Tin (f.o.b. N. Y.) c/lb. Duty Free													
Straits	21.15	21.70	21.875	21.90	21.95	.....	21.875	21.75	21.75	21.70	21.95	20.60	21.347
Pig 99%	20.75	21.20	21.375	21 40	21.50	.....	21.375	21.25	21.25	21.20	21.50	20.125	20.845
Lead (f.o.b. St. L.) c/lb. Duty 2½c/lb.	3.55	3.55	3.55	3 55	3.55	.....	3.55	3.55	3.55	3.55	3.65	3.55	3.591
Aluminum c/lb. Duty 4c/lb	23.30	23.30	23.30	23.30	23.30	.....	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3c/lb.													
Ingot	35	35	35	35	35	.....	35	35	35	35	35	35	35
Shot	36	36	36	36	36	.....	36	36	36	36	36	36	36
Electrolytic	35	35	35	35	35	.....	35	35	35	35	35	35	35
Antimony (J. & Ch.) c/lb. Duty 2c/lb	6.25	6.25	6.25	6 25	6.25	.....	6.15	6.15	6.15	6.15	6.50	6.15	6.257
Silver c/oz. Troy Duty Free	30.75	30.75	30.625	30.625	30.625	.....	30.375	30.25	30.125	30.25	31.625	28.50	30.125
Platinum $/oz. Troy Duty Free	37.50	37.50	37.50	37.50	37.50	.....	37.50	37.50	37.50	37.50	37.50	37.50	37.50

*Holiday.

Metal Prices, January 12, 1932

(Duties mentioned refer to U. S. tariffs on imports, as given in the Tariff Act of 1930.)

NEW METALS

Copper: Lake, 7.625. Electrolytic, 7.375. Casting, 7.25.
Zinc: Prime Western, 3.05. Brass Special, 3.15.
Tin: Straits, 22.00. Pig, 99%, 21.50.
Lead: 3.55. **Aluminum,** 23.30. **Antimony,** 6.00.
Nickel: Ingot, 35. Shot, 36. Elec. 35. Pellets, 40.
Quicksilver: flask, 75 lbs., $66. **Bismuth,** $1.00.
Cadmium, 55. **Cobalt,** 97%, $2.50. **Silver,** oz., Troy (N. Y. official price January 13), 29.875.
Gold: oz., Troy, $20.67. **Platinum,** oz., Troy, $37.50 to $40.00.

Duties: Copper, free; zinc, 1¼c. lb.; tin, free; lead, 2½c. lb.; nickel, 3c. lb.; quicksilver, 25c. lb.; bismuth, 7½%; cadmium, 15c. lb.; cobalt, free; silver, free; gold, free; platinum, free.

INGOT METALS AND ALLOYS

	Cents lb.	Duty
Brass Ingots, Yellow	5½to 7½	45%
Brass Ingots, Red	7⅛to 8¾	45%
Bronze Ingots	8⅛to11	45%
Casting Aluminum Alloys	19 to22	4c. lb.
Manganese Bronze Castings	18 to35	45%
Manganese Bronze Ingots	6¾to11	45%
Manganese Bronze Forgings	26 to35	45%
Manganese Copper, 30%	17 to25	25%
Monel Metal Shot or Blocks	28	25%
Phosphor Bronze Ingots	9 to12	45%
Phosphor Copper, guaranteed 15%	11 to15	3c. lb.
Phosphor Copper, guaranteed 10%	10½to14½	3c. lb.
Phosphor Tin, no guarantee	27 to37	Free
Silicon Copper, 10%	17 to35	45%
Iridium Platinum, 5%	$43.00	Free
Iridium Platinum, 10%	$46.00	Free

OLD METALS

Dealers' buying prices, wholesale quantities	Cents lb.	Duty
Heavy copper and wire, mixed	4⅝to 5⅛	Free
Light Copper	4¼to 4½	Free
Heavy yellow brass	2⅜to 2⅞	Free
Light brass	2⅛to 2⅜	Free
No. 1 Composition	3⅞to 4⅛	Free
Composition turnings	3⅝to 3⅞	Free
Heavy Soft lead	2⅝to 2⅞	2⅛c. lb.
Old Zinc	1⅛to 1¼	1½c. lb.
New zinc clips	1¾to 2	1½c. lb.
Aluminum clips (new, soft)	11 to12	4c. lb.
Scrap aluminum, cast, mixed	3½to 4	4c. lb.
Scrap aluminum sheet (old)	8½to 9	4c. lb.
No. 1 pewter	11½to12½	Free
Electrotype and Linotype	2½to 3¼	2⅛c. lb.*
Nickel anodes	21 to22	10%
Nickel sheet clips; rod ends (new)	23 to24	10%
Monel scrap	5½to 7	3c. lb.

* On lead content.

Wrought Metals and Alloys

The following are net BASE PRICES per pound, to which must be added extras for size, shape, small quantity, packing, etc., as shown in manufacturers' price lists, effective December 17, 1931.

COPPER MATERIAL

	Net base per lb.	Duty
Sheet, hot rolled	16⅜c.	2⅛c. lb.
Bare wire	9 c.	25%
Seamless tubing	15⅞c.	7c. lb.
Soldering coppers	16⅞c.	45%

NICKEL SILVER (NICKELENE)

Net base prices per lb. (Duty 30% ad valorem.)

Grade "A" Sheet Metal		Wire and Rod	
10% Quality	21¾c.	10% Quality	24⅞c.
15% Quality	24 c.	15% Quality	28⅞c.
18% Quality	25¼c.	18% Quality	32⅜c.

BRASS MATERIAL—MILL SHIPMENTS

Net base prices per pound

Net per lb.	High Brass	Low Brass	Bronze	Duty
Sheet	13¼c.	14½c.	15 c.	4c. lb.
Wire	13¼c.	14½c.	15 c.	25%
Rod	11 c.	14½c.	15 c.	4c. lb.
Brazed tubing	22 c.		25⅝c.	12c. lb.
Open seam tubing	21 c.		22¾c.	25%
Angles, channels	21 c.		22¾c.	12c. lb.
Seamless tubing	16½c.		18⅛c.	8c. lb.

TOBIN BRONZE AND MUNTZ METAL

Net base prices per pound.	(Duty 4c. lb.)
Tobin Bronze Rod	14¾c.
Muntz or Yellow Metal Sheathing (14"x18")	15⅛c.
Muntz or Yellow Rectangular sheet other sheathing	15⅛c.
Muntz or Yellow Metal Rod	12 c.

ALUMINUM SHEET AND COIL

(Duty 7c. per lb.)

Aluminum sheet, 18 ga., base, ton lots, per lb.	32.30
Aluminum coils, 24 ga., base price	30.00

ROLLED NICKEL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Net Base Prices

Cold Drawn Rods	50c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

MONEL METAL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

SILVER SHEET

Rolled sterling silver (January 13) 33.00c. per Troy oz. upward, according to quantity. (Duty free.)

ZINC AND LEAD SHEET

	Cents per lb. Net Base	Duty
Zinc sheet, carload lots, standard sizes and gauges, at mill, less 7 per cent discount	9.00	2c. lb.
Zinc sheet, full casks (jobbers' price)	9.25	2c. lb.
Zinc sheet, open casks (jobbers' price)	10.00to10.25	2c. lb.
Full Lead Sheet (base price)	7.00	2⅜c. lb.
Cut Lead Sheet (base price)	7.25	2⅜c. lb.

BLOCK TIN AND BRITANNIA METAL SHEET

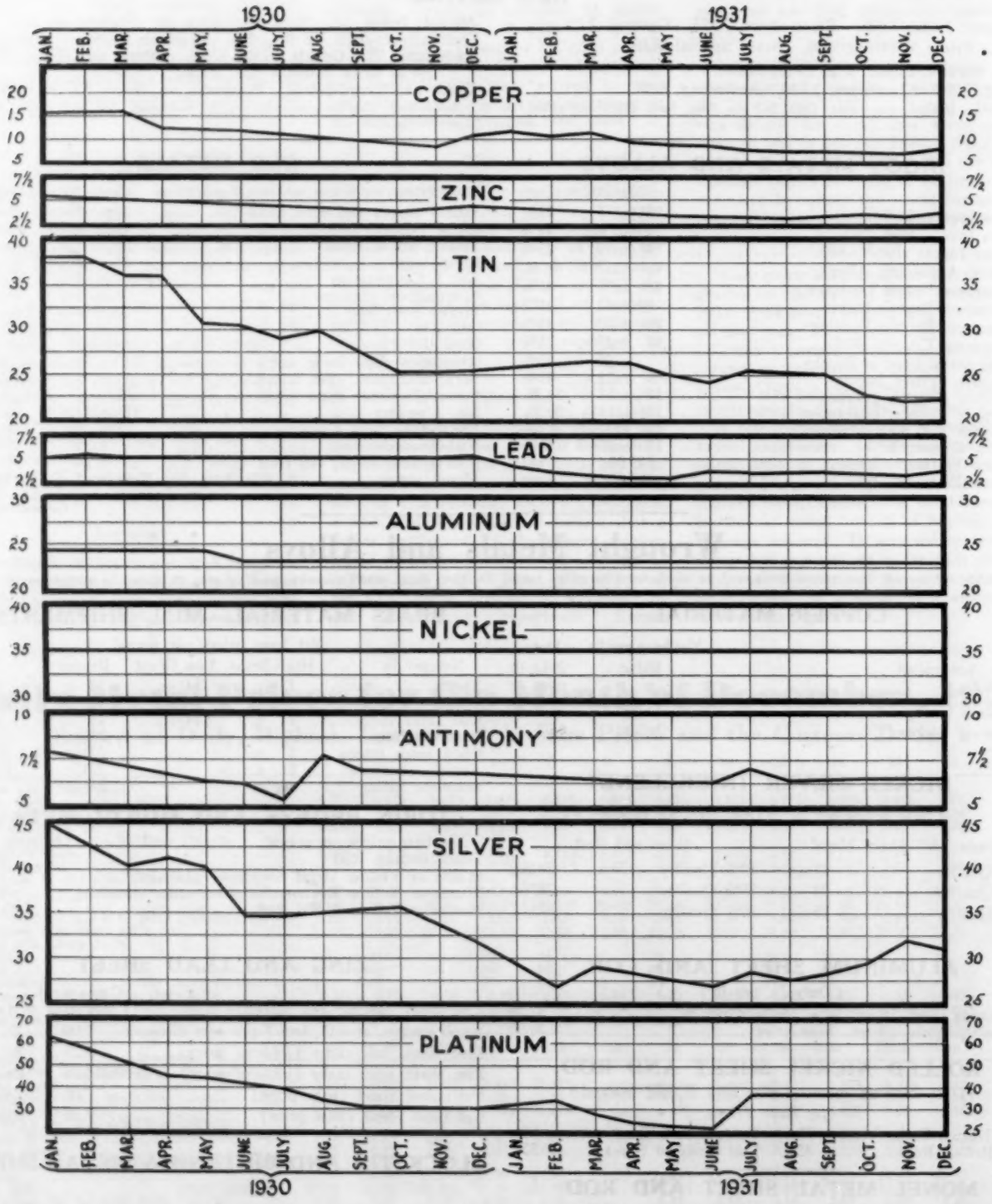
(Duty free)

This list applies to either block tin or No. 1 Britannia Metal Sheet, No. 23 B. & S. Gauge, 18 inches wide or less; prices are all f. o. b. mill:

500 lbs or over .....15c. above N. Y. pig tin price
100 to 500 lbs. .....17c. above N. Y. pig tin price
Up to 100 lbs. .....25c. above N. Y. pig tin price

Lighter gauges command "extras" over the above prices.

Chart of Metal Prices for 1930-1931



NOTE:—Prices shown on left and right edges of chart are in cents per pound, except for silver and platinum, which are in cents per troy ounce and dollars per troy ounce, respectively.

Supply Prices—Page 48.

Pig Iron and Metal Products of the United States

Calendar Years 1922-1930. (1931 Estimated.)

(FROM THE UNITED STATES BUREAU OF MINES)

PRODUCTS METALLIC	1922 Quantity	1922 Value	1923 Quantity	1923 Value	1924 Quantity	1924 Value	Products
Pig iron (spot value), long tons	27,670,738	$608,144,858	38,361,379	$946,799,378	31,064,129	$665,078,972	Pig iron
Copper, sales value, pounds	950,285,947	128,289,000	1,434,999,962	210,945,000	1,634,249,192	214,087,000	Copper
Zinc, sales value, short tons	353,274	40,273,000	508,335	69,134,000	515,831	67,058,000	Zinc
Tin, short tons	1	912	2	1,623	7	7,028	Tin
Lead (ref.) sales value, short tons	468,746	51,562,000	543,841	76,138,000	566,407	90,625,000	Lead
Aluminum, pounds	74,000,000	13,622,000	129,000,000	28,305,000	150,000,000	37,607,000	Aluminum
Nickel, value at New York, short tons	208	133,191	100	71,605	191	114,903	Nickel
Quicksilver, value at S. Fran., flasks(e)	6,375	368,348	7,937	521,302	10,085	692,739	Quicksilver
Antimonial lead, short tons (F.&D.)	8,075	844,993	14,190	1,950,370	20,787	3,376,713	Antim. Lead
Silver, commercial value, troy ounces	56,240,048	56,240,048	73,335,170	60,134,839	65,407,186	43,822,814	Silver
Gold, coining value, troy ounces	2,363,075	48,849,100	2,502,632	51,734,000	2,528,900	52,277,000	Gold
Platinum and allied metals, value at New York City, in troy ounces	57,718	5,932,726	49,797	5,762,305	66,007	7,611,319	Platinum
Total value of metallic products (approximate) (b)		$987,180,000		$1,510,930,000		$1,232,330,000	

PRODUCTS METALLIC	1925 Quantity	1925 Value	1926 Quantity	1926 Value	1927 Quantity	1927 Value	Products
Pig iron (spot value), long tons	36,814,702	$739,316,333	38,181,053	$749,633,468	34,866,644	$646,226,139	Pig iron
Copper, sales value, pounds	1,674,869,886	237,832,000	1,739,622,094	243,547,000	1,684,040,983	220,609,000	Copper
Zinc, sales value, short tons	555,631	84,456,000	611,991	91,799,000	576,960	73,851,000	Zinc
Tin, short tons	14	15,980	8	10,400	27	34,600	Tin
Lead (ref.) sales value, short tons	654,921	113,956,000	680,685	108,910,000	668,320	84,208,000	Lead
Aluminum, pounds	140,000,000	36,430,000	145,000,000	37,583,000	160,000,000	39,266,000	Aluminum
Nickel, value at New York, short tons	272	169,664	323	234,558	860	390,740	Nickel
Quicksilver, value at S. Fran., flasks(e)	9,174	762,616	7,642	702,323	11,276	1,314,782	Quicksilver
Antimonial lead, short tons (F.&D.)	19,667	3,785,547	22,524	3,916,714	24,347	3,277,043	Antim. Lead
Silver, commercial value, troy ounces	66,155,424	45,911,864	62,718,746	39,136,497	60,434,441	34,266,328	Silver
Gold, coining value, troy ounces	2,411,987	49,860,200	2,335,042	48,269,600	2,197,125	45,418,600	Gold
Platinum and allied metals, value at New York City, troy ounces	49,643	5,661,809	84,981	9,210,669	46,050	3,780,216	Platinum
Total value of metallic products (approximate) (b)		$1,380,280,000		$1,402,920,000		$1,217,000,000	

PRODUCTS METALLIC	1928 Quantity	1928 Value	1929 Quantity	1929 Value	1930 Quantity	1930 Value	Products
Pig iron (spot value), long tons	38,303,699	$661,351,270	41,549,161	$731,858,075	29,905,355	$512,165,131	Pig iron
Copper, sales value, pounds	1,825,900,393	262,930,000	2,002,863,135	352,504,000	1,394,389,327	181,271,000	Copper
Zinc, sales value, short tons	591,525	72,166,000	612,136	80,802,000	489,361	46,979,000	Zinc
Tin, short tons	47	47,400	39	35,600	17	10,500	Tin
Lead (ref.) sales value, short tons	626,202	72,639,000	672,498	84,735,000	573,740	57,374,000	Lead
Aluminum, pounds	210,000,000	47,899,000	225,000,000	51,864,000	229,035,000	50,961,000	Aluminum
Nickel, value at New York, short tons	522	291,836	340	297,273	308	213,803	Nickel
Quicksilver, value at S. Fran., flasks(e)	17,870	2,207,003	23,682	2,892,638	21,553	2,478,789	Quicksilver
Antimonial lead, short tons (F.&D.)	33,058	3,978,318	25,669	3,267,095	13,711	1,392,524	Antim. Lead
Silver, commercial value, troy ounces	58,462,507	34,200,567	61,327,868	32,687,754	50,748,127	19,538,029	Silver
Gold, coining value, troy ounces	2,233,251	46,165,400	2,208,386	45,651,400	2,285,603	47,247,600	Gold
Platinum and allied metals, value at New York City, in troy ounces	59,039	4,692,786	47,977	3,121,471	43,502	2,048,824	Platinum
Total value of metallic products (approximate) (b)		$1,284,580,000		$1,475,990,000		$982,550,000	Approximate

ESTIMATES OF UNITED STATES PRODUCTION FOR 1931	Quantity	Value Total	Value Per Unit	
Pig iron (spot value) long tons	18,275,155	$283,447,654	$15.51 ton	(a)
Copper, sales value, short tons	470,000	76,290,400	8.116c. lb.	(c)
Zinc, sales value, short tons	300,000	20,840,000	3.64c. lb.	(d)
Tin (U. S. deliveries) long tons	63,450	34,774,458	24.467c. lb.	
Lead (pig), sales value, short tons	425,000	34,416,500	4.049c. lb.	(d)
Aluminum, short tons	*			
Silver, troy ounces	31,300,000	8,983,100	28.70c. oz.	
Gold, troy ounces	2,365,881	48,907,100	$20.67 oz.	

(a) Composite, from The Iron Age.

(b) Includes some items of minor interest to metal trades not shown in table.

(c) New York. (d) E. St. Louis.

(e) For years 1920 to 1927, inclusive, mercury reported by the Bureau of Mines in flasks of 75 pounds; for 1928 and succeeding years, in flasks of 76 pounds.

* Production figures unavailable at date of issue.

Supply Prices, January 12, 1932

ANODES

Copper: Cast ..... 18⅝c. per lb.
Rolled, sheets, trimmed ..... 17½c. per lb.
Rolled, oval ..... 15⅜c. per lb.
Brass: Cast ..... 18⅜c. per lb.
Zinc: Cast ..... 10½c. per lb.

Nickel: 90-92% ..... 44c. to 45c. per lb.
95-97% ..... 41c. to 47c. per lb.
99% ..... 41c. to 49c. per lb.
Silver: Rolled silver anodes .999 fine were quoted January 13 from 33.00c., per Troy ounce upward, depending upon quantity.

FELT POLISHING WHEELS WHITE SPANISH

Diameter	Thickness	Under 50 lbs.	50 to 100 lbs.	Over 100 lbs.
10-12-14 & 16	1″ to 2″	$3.00/lb.	$2.75/lb.	$2.65/lb.
10-12-14 & 16	2 to 3½	3.00	2.70	2.50
6-8 & over 16	1 to 3½	3.10	2.85	2.70-2.75
6 to 24	Under ½	4.25	4.00	3.90
6 to 24	½ to 1	4.00	3.75	3.65
6 to 24	Over 3	3.40	3.15	3.05
4 to 6	¼ to 3	4.85	4.85	4.85
4 to 6	Over 3	5.25	5.25	5.25
Under 4	¼ to 3	5.45	5.45	5.45
Under 4	Over 3	5.85	5.85	5.85

On grey Mexican wheels deduct 10c. per lb. from White Spanish.

COTTON BUFFS

Full disc open buffs, per 100 sections, when purchased in lots of 100 or less:

11″ 20 ply 64/68 Unbleached	$14.85 to $15.95
14″ 20 ply 64/68 Unbleached	24.00 to 25.80
11″ 20 ply 80/92 Unbleached	18.20 to 19.20
14″ 20 ply 80/92 Unbleached	29.30 to 31.20
11″ 20 ply 84/92 Unbleached	24.10 to 24.60
14″ 20 ply 84/92 Unbleached	39.30 to 40.10
11″ 20 ply 80/84 Unbleached	24.10 to 24.60
14″ 20 ply 80/84 Unbleached	39.30 to 40.10

Sewed Pieced Buffs, per lb., bleached ..... 42c. to 70c.

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.09¾-.14
Acid—Boric (Boracic) Powdered	lb.	.08⅛-.09½
Chromic, 75 to 400 lb. drums	lb.	.14¼-.17½
Hydrochloric (Muriatic) Tech., 20 deg., carboys	lb.	.02
Hydrochloric, C. P., 20 deg., carboys	lb.	.06
Hydrofluoric, 30%, bbls.	lb.	.08
Nitric, 36 deg., carboys	lb.	.06-.06½
Nitric, 42 deg., carboys	lb.	.07-.08
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl	lb.	14.30-21.70
Denatured drums	gal.	.35½-.43½
Alum—Lump, barrels	lb.	.03¼-.04
Powdered, barrels	lb.	.03½-.04
Ammonia, agua, 26 deg., drums, carboys	lb.	.03½-.05
Ammonium sulphate, tech., bbls	lb.	.03½-.05
Sulphocyanide	lb.	.28-.37
Arsenic, white, kegs	lb.	.04½-.05
Asphaltum	lb.	.35
Benzol, pure	gal.	.58
Borax Crystals (Sodium Biborate), bbls.	lb.	.04½
Cadmium oxide, 50 to 1,000 lbs.	lb.	.65
Calcium Carbonate (Precipitated Chalk)	lb.	.05¾-.07½
Carbon Bisulphide, drums	lb.	.05½-.08
Chrome Green, bbls.	lb.	.24
Chromic Sulphate	lb.	.30-.40
Copper—Acetate (Verdigris)	lb.	.30-.33
Carbonate, bbls.	lb.	.14-.20
Cyanide (100 lb. kgs.)	lb.	.39
Sulphate, bbls.	lb.	.038-.05¼
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.20¼-.20½
Crocus	lb.	.15
Dextrin	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluor-spar, bags	ton	.04½
Gold Chloride	oz.	$12.00
Gum—Sandarac	lb.	.26
Shellac	lb.	.59-.61
Iron Sulphate (Copperas), bbls.	lb.	.01½
Lacquer Solvents	gal.	.85
Lead Acetate (Sugar of Lead)	lb.	.13¼
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Methanol, 100% synth., drums	gal.	.41½
Nickel—Carbonate, dry bbls.	lb.	.32
Chloride, bbls.	lb.	.18-.19½
Salts, single, 300 lb. bbls.	lb.	.10½-.13
Salts, double, 425 lb. bbls.	lb.	.10½-.13
Paraffin	lb.	.05-.06
Phosphorus—Duty free, according to quantity	lb.	.35-.40
Potash Caustic Electrolytic 88-92% broken, drums	lb.	.06¾-.08½
Potassium Bichromate, casks (crystals)	lb.	.09
Carbonate, 96-98%	lb.	.06¾
Cyanide, 165 lbs. cases, 94-96%	lb.	.50-.60
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge, nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in bbls.	lb.	.04½-.05¾
Silver Chloride, dry, 100 oz. lots	oz.	.26¾-.27
Cyanide (fluctuating)	oz.	.34½-.40
Nitrate, 100 ounce lots	oz.	.23¼-.23½
Soda Ash, 58%, bbls.	lb.	.023
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.16½-.22
Hyposulphite, kegs, bbls.	lb.	.03½-.06½
Metasilicate	lb.	.05-.06¼
Nitrate, tech., bbls.	lb.	.03¼-.07
Phosphate, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.01½
Stannate	lb.	.21½
Sulphocyanide	lb.	.28-.45
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.25½-.27
Tripoli, powdered	lb.	.03
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc, Carbonate, bbls.	lb.	.11
Chloride, drums, bbls.	lb.	.07½-.10
Cyanide (100 lb. kegs)	lb.	.38
Sulphate, bbls.	lb.	.03½